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ABSTRACT

The purpose of this study was to determine if the developmental studies courses and the sequential program of developmental studies courses offered at North Harris Montgomery Community College District (NHMCCD) in Texas adequately prepared students for academic success in the first college-level English and/or mathematics courses. All first-time-in-college developmental studies cohort students, beginning with the fall 1992 term through the spring 1998 term, were tracked for completion and persistence through their respective developmental studies program and for enrollment and academic success in the first-level college-level course in English and mathematics. Absolutely underprepared students demonstrated an academic success rate of 1.88% to 10.91%. The academic success rates of the relatively underprepared cohorts were between 24.44% and 46.32%. In contrast, the success rate of first-time-in-college students determined to be college ready was identified as 73.85% for college-level English, and 62.09% for college-level mathematics. Persistence rates for the absolutely underprepared were between 3.76% and 24.91%, while persistence rates for the relatively underprepared were 40.45% to 84.78%. This paper makes recommendations for the improvement of success and persistence rates, including elimination of "in-progress" grading, and designing courses as competency based without semester completion dates. Appendixes include Developmental Studies and Academic Course Descriptions and Letters of Support. (Contains 24 tables and 83 references. (NB)

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A Quantitative Longitudinal Analysis of North Harris Montgomery Community College District's Developmental Studies Program as a Model for Developmental Studies Program Evaluation

A Dissertation Submitted to the Faculty of

Baylor University

in Partial Fulfillment of the

Requirements for the Degree

of

Doctor of Education

By

Joseph Terry Sawma

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ABSTRACT

A Quantitative Longitudinal Analysis of North Harris Montgomery Community College District's Developmental Studies Program as a Model for Developmental Studies Program Evaluation

Joseph Terry Sawma

Chairperson: Robert C. Cloud, Ed.D.

The purpose of this study was to determine if the developmental studies courses, and the sequential program of developmental studies courses, offered at North Harris Montgomery Community College District (NHMCCD), adequately prepares students for academic success in the first college-level English and/or mathematics courses.

All first-time in-college developmental studies cohort students, beginning with the fall 1992 term through to the spring 1998 term, were tracked for completion and persistence through their respective developmental studies program and for enrollment and academic success in the first-level, college-level course in English and mathematics.

Absolutely underprepared students demonstrated an academic success rate many times lower than students classified as *relatively underprepared*. The academic success rates in percent for the *absolutely underprepared* cohorts were 1.88 % to 10.91%. This indicates that between 2 - 10 *absolutely underprepared* students out of every 100 *absolutely underprepared* students successfully completed their first college-level course over the entire reporting period.

The academic success rates of the *relatively underprepared* cohorts were between 24.44 % – 46.32 %. This indicates that between 24 - 46 *relatively underprepared* students out of every 100 *relatively underprepared* students successfully completed their first college-level course over the entire reporting period.

In contrast, the academic success rate of first-time in-college students, determined to be college-ready by virtue of standardized assessment examination placement, was identified as 73.85% for college-level English and 62.09 % for college-level mathematics. The academic success rates for the *relatively underprepared* cohorts, although 2-4 times higher compared to the academic success rates for the *absolutely underprepared* cohorts, were still 2-3 times lower compared to the control cohort students that did not require developmental studies courses.

Persistence rates for the *absolutely underprepared* cohort were between 3.76 % to 24.91 %. Therefore, for every 100 *absolutely underprepared* students, between 4 to 25 of these students ever persist to *enroll* in a college-level academic course. In contrast, the relatively underprepared cohorts demonstrated persistence rates between 40.45 % to 84.78 %. Therefore, for every 100 *relatively underprepared* students, between 40 to 85 of these students persist to *enroll* in a college-level academic course.

CHAPTER ONE

Introduction

Many entering freshman enrolled in higher education at the university, four-year college or community college level are underprepared and are unable to read, write or perform mathematics required to succeed in college. The population of underprepared students enrolled in American colleges and universities is enormous (Roueche and Roueche, 1993; Texas Higher Education Coordinating Board, Division of Research, Planning and Finance, 1997). Enrollment of underprepared students in higher education is expected to increase from an estimated 13.9 million students in 1995 to 16.1 million by 2007 (McClenney, 1998).

Today, fifty-four percent of all students enrolled in developmental education courses in reading, writing, or mathematics attend America's community colleges while thirty percent attend public universities and four-year colleges (Smith, Young, Bae, Choy, and Alsalam, 1997). Less than sixteen percent of all developmental studies students are enrolled in private four-year institutions (National Center for Education Statistics, 1997). A 1995 National Center for Education Statistics (NCES) survey identified that 78 percent of higher education institutions that enrolled freshmen offered at least one remedial reading, writing, or mathematics course.

This population of underprepared students comes to higher education through varied and multiple pathways. Some are students who enroll in higher education directly out of high school and lack basic skills in reading, writing, and/or mathematics. Others are students who did not pursue higher education directly out of high school and are

returning to education to find that their basic skills in reading, writing and/or math have diminished from inactivity (Blanchette, 1997). Upon entering higher education, an increasing number of high school graduates are discovering that they never adequately developed the basic skills required by post-secondary educational institutions (Smith, et al.., 1997). Still another segment of this population are entering college to increase basic skills in response to workplace demands for higher level reading, writing, and math skills. Consequently, the population of underprepared students is very diverse (Smith, et al., 1997).

Students in need of developmental education are enrolled in American colleges, universities, community, and technical colleges. Universities, four-year colleges and community colleges have developed basic skills assessment tools and strategies to identify the underprepared student and designed courses in reading, writing, and mathematics to serve the needs of these underprepared students. The National Center for Education Statistics reports that 100 percent of public two-year colleges, 81 percent of public four-year institutions, and 63 percent of private colleges and universities offer developmental education courses for their learners (Lazarick, 1997).

The fact that American students are in need of remediation in reading, writing, and mathematics is very disconcerting and often leads to a public indictment of the K-12 public schools for failing to produce a literate graduate (Ikenberry, 1999 and Ignash, 1998). Many policy makers, legislators, and community leaders believe that the offering of basic skills education in reading, writing and mathematics has no place in higher education. Alexander Astin declares that the "underprepared student is a kind of pariah in American higher education" and poses a threat to the reputations of the colleges and the perception of educational excellence (Astin, 1998). Some contend that if the public

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schools were held accountable for producing literate graduates with the basic skills required to succeed in college, the country would not be faced with the controversial issue of remediating students in higher education. As Blanchette (1997) and others point out, the offering of basic skills at the post-secondary level is considered double dipping into the American taxpayer pocket. Many believe that we should not have to pay twice for failure of the public schools to deliver basic skills (McCabe and Day, 1998, Hebel, 1999, Phipps, 1999, Blanchette, 1997 and Adelman, 1996).

Some states have eliminated remedial courses at the university level and relegated all remedial education to the community colleges (Roueche, 1999). Others are exploring legislative means to decrease the costs for remedial studies courses (Lively, 1993 and Survey of Education Policies Concerning Developmental Education at the Local, State, and Federal Level in the U.S., January 15, 1997). Many universities have begun increasing the admission requirements to include minimum standardized test scores that exclude enrollment of underprepared students (Hebel, 1999 and Schrag, 1999). Other tactics used to address the issue have included mandating legislative charge-backs or fines to public secondary schools whose students graduate with basic skill deficiencies. Some states are considering legislation that will require high school districts to reimburse higher educational institutions receiving underprepared students for the cost of remediating (Arendale, 1998). Other states have enacted a high school exit exam that is intended to indicate college-level readiness and require all students to pass this exit exam as a qualifier for graduation (Roueche, 1999).

Some American colleges, in an effort to decrease the cost of remediation, are outsourcing remediation services to private for-profit providers such as Kaplan Learning Services and Sylvan Learning Systems (Gose, 1997 and Grastie, 1999). Others welcome

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the partnerships with K-12 public schools, community colleges, colleges, universities, business and industry and private providers to meet the great demand for basic skills remediation (Arendale, 1997; Boylan, 1995).

Colleges, universities, and community colleges have recognized that the population of underprepared students are not simply in need of remediation in reading, writing, and/or mathematics in order to be academically successful and college-ready (Astin, 1997; Chickering, 1969; and Boylan, 1995). Success in college requires personal autonomy, self-confidence that success is achievable, efficient and effective study skills, interpersonal skills, social skills, as well as reading, writing and math skills (Astin, 1997).

Hunter Boylan, Director of the National Center for Developmental Education (NCDE), and other researchers clearly distinguish between developmental education and remedial education (Boylan, 1995). Remedial education implies that these basic skills have been taught previously and must be re-taught. In contrast, developmental education is a holistic approach and is designed to teach basic skills that have not previously been taught or previously learned (Boylan, 1995). Developmental education programs do not blame the learner for failing to obtain basic skills but rather with the lack of preparation (Carriulo, 1994). Since parents, lawmakers, policy makers, and corporate America have an understanding of the term 'remedial' as a wasted time and failure of the learner, they are quick to indict the public schools and call for a radical reformation of the public school systems. Developmental education programs are designed to address all the needs of the learner including affective and cognitive skill development. Developmental education programs are an integrated design approach to prepare underprepared students for collegiate-level success. Therefore, these developmental studies programs integrate student support services, assessment, student performance assessment, early intervention,

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learning theories, study skill development, faculty and student mentors, financial and academic counselors, and support groups with cognitive education (Roueche and Roueche, 1999).

The need for remediation is not a 21st century phenomenon (Brier, 1984). Remedial education was always a necessity in higher education beginning with Harvard College in the 1600's, long before high schools or community colleges came onto the educational landscape (Phipps, 1998). American remedial education began in the 17th century with Harvard College and other College Preparatory Programs and has been with the higher education systems for over 300 years.

Today's workers must be literate in reading, writing, and mathematics as well as technology at a much different level than a decade ago. Since the beginning of the industrial age of America and on through to the current information and technology age of America, employers have demanded increased and different skills of their workers.

The public need for higher education continues to fuel an ever-increasing population of underprepared students. Community colleges, with their egalitarian mission statements and open-door policies, have received the majority of America's underprepared students (McClenney, 1998). As more and more workers seek higher education to gain the skills demanded in the workplace, enrollments of underprepared students are expected to increase (Macunovich, 1997).

All of higher education, in partnership with the K-12 public schools and private providers, must stand ready to meet the moral and social obligation and offer effective and efficient developmental studies programs. Public support for developmental studies programs is evidenced by the fact that funding to support developmental education in higher education sector has increased dramatically over the past ten years and is expected

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to continue to increase along with demand. In Texas, alone, appropriations supporting developmental education rose 346 percent between 1989 and 1999 from $38.6 million in 1988-89 to $172 million in 1998-99. This does not include other associated costs such as student tuition and fees, ad-valorem taxes in community college districts, and faculty salaries (Texas Higher Education Coordinating Board, 1998). Certainly, a simple extrapolation to all other states creates a staggering expenditure for delivery of developmental education in the United States. With annual expenditures supporting developmental education on the rise, it is clear that developmental education will continue to be a part of the core function of higher education (Phipps, 1998).

Taxpayers, beneficiaries and users of education must be concerned about the ever-increasing costs of delivering developmental education and should ask about the success of the existing developmental education programs. There has been minimal research conducted to identify effective best practices, success measures, and efficient practices (Boylan, 1999; Roueche and Roueche, 1999; McCabe and Day, 1998). A thorough evaluation of developmental studies programs is required to identify efficient practices, effective programmatic designs, and successful instructional methodologies. It is only through programmatic evaluation than an institution can identify practices that are effective for specific learners, correlate effective practices for the students they serve and improve these programs of study.

This study is designed to evaluate a developmental studies program at a large multi-college community college district. It is a quantitative longitudinal analysis of the developmental studies program at North Harris Montgomery Community College (NHMCCD) and includes data analysis of developmental studies student performance for twelve consecutive sixteen-week semesters. The academic success of developmental

studies students were compared to a control group of students enrolled in academic college-level English and/or mathematics courses. The study will compare the success rates of developmental students completing a developmental program of study and enrolling in first-year academic courses to the success rates of students enrolled in college-level academic courses who did not require developmental education.

Limitations of the Study

A recognized limitation of this study is the lack of data related to gender, ethnicity, socioeconomic status, or age. Developmental education programs are designed for all students regardless of gender, ethnicity, socioeconomic status, or age. The research design of the proposed study deliberately omitted academic success by gender, ethnicity, socioeconomic status, or age. Although data elements are available for gender, age and ethnicity, data elements for socioeconomic status are not available and could only be inferred based on financial aid awarded to those students who applied for financial aid.

The addition of data elements for age, gender, and ethnicity would appreciatively increase the scope and size of the proposed study and are not inherent in the proposed research questions. The overall academic success of developmental studies programs compared to a control group is a first step in program evaluation. Future program evaluation research may be designed to address academic success as related to gender, age, socioeconomic status and/or age, if appropriate.

Additional limitations of this study include that it does not account for differences in teaching methodology or learner motivation and learner goals. In addition, the study does not account for differences in developmental studies programs between or within

any of the four colleges of the North Harris Montgomery Community College District. Other limitations may include alternate reasons for failure to complete a course such as employment, death, illness, family responsibilities, financial reasons, imprisonment, military service, and others. It does not account for differences between large suburban, rural or urban community colleges or community college districts, institutional size, course scheduling differences, and availability of courses. Further, the study does not address typical limitations placed on all students including transportation, access, need for child care, commuting distance, support or lack of support from family or peer group, and alternate developmental courses required in a stated developmental sequence.

Statement of the Problem

North Harris Montgomery Community College District has never conducted a comprehensive analysis of its developmental studies program data. The District has established a developmental studies program that is expectedly sequential in structure and is designed to lead to academic success in college-level English and mathematics courses. However, without a comprehensive analysis of the developmental studies program data, the effectiveness and efficiency of the developmental studies programs are unknown. A comprehensive quantitative longitudinal study of the data will ascertain the academic success of developmental studies students compared to a control group of students not requiring developmental education enrolled in college-level English and/or mathematics courses. The study will determine if the developmental studies program is successful in preparing students for collegiate-level success in English and mathematics. The study will also serve as a national model for developmental studies program evaluation and in

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preparing students for academic success in collegiate-level courses in English and mathematics.

Research Questions

1. What is the success rate of First-Time-In-College (FTIC) students enrolled in only ENGL 0304 (Developmental Reading I), or only ENGL 0306 (Developmental Writing I), or only MATH 0306 (Pre-Algebra) between fall 1992 to spring 1998?

2. What is the success rate of First-Time-In-College (FTIC) students enrolled in only ENGL 0305 (Developmental Reading II), or only ENGL 0307 (Developmental Writing II), or only MATH 0310 (Intermediate Algebra) between fall 1992 to spring 1998?

3. What is the success rate of First-Time-In-College (FTIC) students enrolled in MATH 0306 (Pre-Algebra) and ENGL 0306 (Developmental Writing I) between fall 1992 to spring 1998?

4. What is the success rate of First-Time-In-College (FTIC) students enrolled in ENGL 0304 (Developmental Reading I) and ENGL 0306 (Developmental Writing I) between fall 1992 to spring 1998?

5. What is the success rate of First-Time-In-College (FTIC) students enrolled in ENGL 0304 (Developmental Reading I) and ENGL 0306 (Developmental Writing I) and MATH 0306 (Pre-Algebra) between fall 1992 to spring 1998.

6. What is the success rate of First-Time-In-College (FTIC) students enrolled in MATH 0310 (Intermediate Algebra) and ENGL 0307 (Developmental Writing II) between fall 1992 to spring 1998.

7. What is the success rate of First-Time-In-College (FTIC) students enrolled in ENGL 0305 (Developmental Reading II) and ENGL 0307 (Developmental Writing II) between fall 1992 to spring 1998?

8. What is the success rate of First-Time-In-College (FTIC) students enrolled in ENGL 0305 (Developmental Reading II) and ENGL 0307 (Developmental Writing II) and MATH 0310 (Intermediate Algebra) between fall 1992 to spring 1998?

9. What are the persistence rates of First-Time-In-College (FTIC) cohorts between fall 1992 and spring 1998?

10. What is the success rate of students who enroll in ENGL 1301 (Composition and Rhetoric I) after successfully completing a developmental ENGL course or sequence as compared to its control group of students?

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11. What is the success rate of students who enroll in MATH 1314 (College Algebra) after successfully completing a developmental MATH course or sequence as compared to its control group of students?

Significance of the Problem

Community colleges must invest in institutional research and developmental studies program evaluation in order to understand the effectiveness of their programs and define the benchmarks to which program improvement can be measured (Boylan and Bonham, 1992). According to Boylan (1985), a positive correlation can be demonstrated between developmental studies program evaluation, student retention, and student achievement in mathematics and English. Despite this correlation, less than one-fifth of developmental studies programs surveyed in a national study conducted systematic evaluations of their developmental studies program (Boylan, Bonham, and Bliss, 1994).

A comprehensive, quantitative, longitudinal, and systematic analysis of the North Harris Montgomery Community College District's developmental studies program data will provide an understanding of the impact of the developmental studies program and serve as a model for developmental studies program evaluation. The study will provide data and identify initial benchmarks for which program improvement can be assessed and measured. The study will quantify the enrollment and academic success rates of developmental studies students in collegiate-level academic courses as compared to a control group. The identification of success rates, persistence rates, and associated success rate variables, including level of deficiency of ASSET score levels and number of semester credit hours attempted, will serve the District as a benchmark for future evaluation and institutional effectiveness.

Indicators of success associated with assessment, placement, and enrollment of students in developmental studies programs may be identified, and this information may be useful to community colleges throughout the nation in evaluation, recommendation, and establishment of more effective practices for developmental education programs.

Definition of Terms

- Academic success: Completion of an academic course with an earned final grade of "C" or better
- ASSET: Assessment of Skills for Successful Entry and Transfer
- Absolutely Underprepared Student: A student enrolled in one or more of the lowest level developmental studies courses
- Cohort Cluster: All first-time developmental studies students enrolled in one or more developmental studies course by cohort year from fall 1992 through spring 1998 in the North Harris Montgomery Community College District
- College Algebra: MATH 1314 offered at North Harris Montgomery Community College District
- Composition and Rhetoric I: ENGL 1301 offered at North Harris Montgomery Community College District
- Developmental Education: The integration of personal and academic development with remedial instruction. Developmental education includes an array of student support services including academic and personal counseling, application and use of tutorial centers, assessment and early intervention techniques, learning theories, student mentors, advisement, financial counselors and financial assistance programs which all combine with remediation to define the developmental studies programs.
- Developmental Reading I: ENGL 0304 offered at North Harris Montgomery Community College District
- Developmental Reading II: ENGL 0305 offered at North Harris Montgomery Community College District
- Developmental Writing I: ENGL 0306 offered at North Harris Montgomery Community College District
- Developmental Writing II: ENGL 0307 offered at North Harris Montgomery Community College District
- Pre-Algebra: MATH 0306 offered at North Harris Montgomery Community College District

- Intermediate Algebra: MATH 0310 offered at North Harris Montgomery Community College District
- College Algebra: MATH 1314
- Persistence: Successful completion of a developmental studies course accompanied by enrollment in Composition and Rhetoric I (ENGL 1301) and/or College Algebra (MATH 1314).
- Relatively Underprepared Student: A student enrolled in one or more of the higher developmental studies courses
- Remedial Education: Remedial education or pre-college level courses in reading, writing, and mathematics. These courses are designed to compensate for deficiencies in prior learning of the basic skills
- Reporting Period: The reporting period for each cohort is defined as the period of time from the initial term in which the students are enrolled in the defined courses through the spring 1998 term.
- Success Rate: Success rates are defined as completion of a course with an earned final grade of "C" or better.

CHAPTER TWO

Review of the Literature

Introduction

The purpose of this study was to determine if the developmental studies courses, and the sequential program of developmental studies courses, offered at North Harris Montgomery Community College District prepare students for academic success in the first college-level English and/or mathematics courses. Academic success of developmental studies students was compared to a control group of students not required to enroll in developmental studies courses and enrolled in the first college-level English and/or mathematics courses.

Students in need of developmental education are enrolled in American colleges, universities, community, and technical colleges. The National Center for Education Statistics reports that 100 percent of public two-year colleges, 81 percent of public four-year institutions, and 63 percent of private colleges and universities offer developmental education courses for their learners (Lazarick, 1997).

Developmental education, the offering of basic skills courses in reading, writing, and mathematics in postsecondary educational institutions, is one of the most controversial issues in American education today (McCabe and Day, 1998). Many perceive the necessity for developmental studies in American colleges as a duplicative effort. Critics suggest that higher education should not be expected to deliver what secondary schools have apparently failed to provide. A commonly expressed belief is that developmental education programs have no place in American higher education

and are unworthy of placement in higher education (McCabe and Day, 1998).

The issue that students in America are in need of remediation is an unpopular topic. Some believe that offering remedial education courses in reading, writing, and mathematics at colleges and universities will "lower the bar", dilute academic standards, and cheapen the value of the university degree and has no place at four year colleges and universities. Others believe that all remediation courses should be offered only at community colleges and still others believe that the need for remediation is due to the failure of public schools to prepare students at the K-12 levels. These individuals proclaim that the need for remediation is preventable if the public schools had been held accountable to produce literate graduates (Ikenberry, 1999 and Ignash 1998).

Some policy makers and legislators are seeking ways to impose fines or charge-backs to high schools that graduate students with need for remediation. Florida, Montana, New Jersey, Washington, and West Virginia are considering plans to require high school districts to reimburse higher educational institutions for the cost of providing remedial courses (Arendale, 1998). These same states have proposed that high schools provide some sort of warranty for their graduates. If these "warranted graduates" go on in higher education and are required to enroll in remedial courses, the high school would be held accountable for the cost of remediation. Some states have implemented a "highstakes" exit exam at the high school level. In Texas, this exam is called the Texas Assessment of Academic Skills or TAAS Test. Peter Schrag describes the dilemma facing Texas education. According to Schrag, if the test does not assess college-preparedness, then the warranty is flawed. If the school's performance is assessed on student scores on the TAAS test, it is in the best interest of the school to rig the results of

these tests, a practice that Schrag claims has been discovered in some school districts (Schrag, 1999).

It is popular to blame the public secondary schools for failing to provide college-preparedness for their students. (Arendale, 1998). Many American lawmakers state that educational instruction in reading, writing, and basic mathematics is provided in the public schools where it belongs and that public school students who fail to gain these basic skills do not have the right to excessively burden the American taxpayer (Blanchette, 1997). Some believe that students admitted into American higher education who enroll in developmental studies courses are double dipping into the pocket book of the American taxpayers (McCabe and Day, 1998 and Hebel, 1999 and Phipps, 1999). In a paper presented at the American Council on Education's Conference on Civic Roles and Responsibilities, Alexander Astin, stated that the "underprepared student is a kind of pariah in American higher education" and poses a threat to the reputations of the colleges and the perception of educational excellence (Astin, 1998). Legislators throughout the United States have taken a public position that taxpayers should not be asked to pay colleges to teach what the public high schools have failed to teach using previously expended public tax dollars (Adelman, 1996).

Hunter Boylan, Director of the National Center for Developmental Education (NCDE), and other researchers clearly distinguish between developmental education and remedial education (Boylan, 1995). Remedial education implies that these basic skills have been taught previously and must be re-taught. In contrast, developmental education is a holistic approach and is designed to teach basic skills that have not previously been taught or previously learned (Boylan, 1995). As Garnett and others point out, taxpayers pay for something when supporting developmental education in higher education, but not

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necessarily the same thing as previously funded (Garnett, 1997). This view emphasizes the clear distinction between developmental education and remedial education held by many developmental educators.

Many challenge the position of some policy makers, government elected officials, and taxpayers who propose eliminating remedial education in the nation's colleges. The call for remedial education programs throughout the nation's colleges is not a question of whether colleges should be providing remedial education at all, but rather a response to a moral obligation to meet the needs of these students (Zeiss, 1999).

Educators in some states believe that it is not appropriate to teach remedial education courses in upper level colleges or universities, and some are exploring the benefits of restricting remedial education only to community colleges. For instance, four-year colleges and universities in Florida, Missouri, and South Carolina are prohibited from offering remedial courses and programs (Roueche, 1999). Florida has placed limits on time and funding and mandated assessment and compensatory remediation for all students who are determined to be in need of remediation (Roueche, 1999). In Louisiana, Arkansas, Tennessee, and Oklahoma, proposals have been made to cut funding for remediation at the universities and four-year colleges (Lively, 1993). Virginia, Tennessee, Nebraska, Minnesota, and Pennsylvania are studying ways to reduce the cost of remedial education (Lively, 1993). State statutes or proposed state statutes do not permit the University of Colorado, Northern Arizona State University, University of Missouri, Ohio State University, Oklahoma State University System, and South Carolina University systems to offer developmental education courses (Survey of Education Policies Concerning Developmental Education at the Local, State, and Federal Level in the U.S., January 15,1997).

The California State University (CSU) system has been in debate over the same issue. The CSU Board of Trustees considered reducing remedial education for incoming freshmen and totally eliminating it by the year 2001. Roughly half of all incoming freshmen at CSU are required to enroll in remedial education courses (Schrag, 1999). The issue was hotly debated because the education plan of California State University (CSU) requires that CSU system accept the top third of the state's high school graduates (Schrag, 1999). However, graduation from high school at this level does not guarantee that the student can place into college level reading, writing, and math, and therefore the students would be denied admission to CSU (The Orion Nov, 8, 1995). The CSU Board decided to restructure the proposal and is instead embarking on a plan to reduce the number of remedial classes over an 11-year period. The plan will include using community colleges to help bridge the gap between high school and university and also improve delivery of educational programs at the K-12 level to reduce the need for remedial education after high school graduation (Education Week, Feb 7, 1996).

California State University system plans to reduce the remedial student population admitted to the state universities to 10 percent of all freshmen by the year 2007. In 1998 the percent of freshman admitted to the California State system requiring remedial education courses was 54% in mathematics and 47% in English (Hebel, 1999). Similarly, state public college systems in Florida, California, Massachusetts, Georgia, Texas, Virginia and New York City CUNY have considered or have implemented policies to assign all remedial education to the community colleges (Shaw, 1997).

In the past, Savannah State University in Georgia had a history of enrolling underprepared and disadvantaged students who might otherwise not pursue higher education. The university used remedial education to prepare these students for academic

success in college-level courses. The Board of Regents of the University System of Georgia approved the plan to reduce the number of students enrolled in remedial education courses by five percent annually to reduce costs (Hebel, 1999). By 2001, the University of Georgia System will no longer admit students in need of remediation in reading, writing or mathematics. The University System is increasing the minimum SAT score required for admission through the year 2001. High school students requiring remediation courses must attend a community college for remediation or enroll in remedial courses offered by private providers before they can be considered for admission to any of the four colleges within the Georgia State University System. Community residents have expressed concerns that the University policy will leave students behind and that the university system will have abandoned its long held mission to admit underprepared students (Hebel, 1999). University officials believe that the university will still receive the same students after they obtain remediation at community colleges and students will come to the university better prepared for academic success (Hebel, 1999). The action taken by the University of Georgia System and by many other universities who have raised admission standards to exclude students in need of remediation begs the question of who shall be the provider of remedial education and who shall pay for this remediation (Hebel, 1999). Hunter Boylan, Director for the National Center, has expressed concerns that higher education reform at upper division colleges and universities may effectively produce a caste system by excluding underprepared students. University enrollments may be limited to those students who receive adequate college-level readiness education at richer high schools and the poorer students who are often in need of remediation would attend community colleges (Boylan, 1995). Unfortunately, the states that have enacted plans to reduce or remove

developmental education courses at their institutions may be writing the policies that would end equal access to higher education (Hebel, 1999, Schrag, 1999).

The Government Performance and Results Act (GPRA) defines how community colleges must assess the success of their remedial education programs when applying for federal financial support. In a report from the Texas Comptrollers Office (1999), *Making Remedial Education Funding Performance-Based*, about fifteen states use incentive funding or competitive grants to improve student preparation in remedial programs. Massachusetts provides grants for students who meet admission standards and for students demonstrating remediation success. Recent educational reform in Massachusetts includes raising admission standards at its four-year colleges and limiting special admissions to 5%. Special admissions status is granted to a limited number of students who do not meet the university's admission requirements (Moreno, 2000). Remedial education in Massachusetts is limited to the state's 15 community colleges (Moreno, 2000). Stanley Koplik, Chancellor for Massachusetts Higher Education identified indirect costs attributable to remedial education including the negative peer effect since underprepared students depress the performance of better students (Moreno, 2000). Koplik states that by offering remedial education courses in four-year colleges effectively lowers the standards of that college and the college will pay greater indirect costs due to a diminished reputation for producing scholars and will experience decreasing revenues due to decreasing student enrollment (Moreno, 2000).

South Carolina prohibits funding remedial education at specified public universities in the state. Wisconsin requires all remedial education programs be offered on a fee-recovery basis. Oklahoma is authorized to charge students a supplemental remediation fee for enrollment in remedial courses.

Beginning in September of 1999, students seeking admission to a four-year City University of New York (CUNY) who fail one or more university assessment tests in mathematics, reading, or writing will not be admitted to the CUNY. Instead, these students will be offered the option of completing a free summer remedial program or passing remedial classes at a City University of New York college or community college. Officials at CUNY estimate that this policy will exclude about one-half the incoming freshman class from gaining admission to the senior colleges. While proponents of this new policy believe that it will produce higher academic admission standards and a better learning environment, others are fearful that the community colleges will not have the resources to be able to respond to the increased number of students requiring remedial education. Richard Stone, a CUNY Board of Trustees member and the individual who cast the swing vote to eliminate remedial education in the eleven CUNY senior colleges, stated that the "goal isn't to shrink remedial education but to relocate it at the six CUNY community colleges" (Chronicle of Higher Education, June 5, 1998). Peter Schrag, in his article entitled "End of the Second Chance" published by The American Prospect (May-June 1999) decries the CUNY decision to phase out remedial education as denying admission to higher education to students who need it most (Schrag, 1999). Students applying to any one of the CUNY colleges that cannot score above the minimum cutoff must enroll in remedial courses at community colleges or through private tutoring companies. Schrag contends that CUNY assessment tools for reading, writing, and mathematics have become admissions tests into CUNY. Most certainly, the egalitarian opportunity has been challenged by the CUNY decision. As a result of the CUNY decision, freshmen enrollments were projected to decrease in the CUNY system by 46% directly due to the new standards.

Aaron Segal, Professor of Political Science at El Paso Community College in El Paso, Texas, believes that practicality should drive the decision of which type of institution should offer remedial education courses. Segal notes that community colleges use full-time, well-trained instructors to teach remedial courses. Conversely, universities often use largely part-time, poorly prepared teaching assistants to teach remedial students. The remedial students at the universities often fail and turn to the community colleges to repeat remedial courses (Chronicle of Higher Education, March 24, 1993). Other states, such as Massachusetts, support this concept. The Massachusetts study titled *Access and Quality: Improving the Performance of Community College Developmental Education Programs*, found that the trend is to eliminate remedial education at the 4-year college level and to place the sole responsibility of delivering remedial education at the community college level (Frengel, 1998).

In response to this public dialogue, several congressional leaders have sought to target federal financial aid to developmental students by redirecting federal assistance to students most able to benefit. They seek to restrict the use of federal financial assistance from Title IV funds supporting developmental studies courses and eliminate the financial aid awarded to students in need of remediation (Blanchette, 1997).

The need for developmental education is not unique to America. British Education Secretary John Patten in 1992 challenged all British universities to address the decline in academic preparedness and achievement by rejecting students with poor verbal and math skills from entry into higher education (Walker, 1992). The British government has insisted that the public schools publish their annual report card identifying student performance on standardized examinations and encouraging the parents not to send their children to schools with poor performance records (Walker, 1992). Like others in the

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United States, Patten contends that the universities should not be forced or coerced to do the job that the secondary schools have failed to do.

The frequency with which policy makers and the general public indict the public schools for failure to ensure that high school graduates possess the basic skills in reading, writing, and mathematics has fueled the demand for public school reformation and accountability. Public school districts are aware that many their graduates are in need of remedial course work and have established educational reform policies to address these concerns. In Wisconsin, the Council of Chief State School Officers (CCSSO) adopted a state-wide strategy to reduce the need for students to repeat classes or grades and increase the academic skills of graduates (Cahir, 1998). Among the adopted strategies was the recommendation to establish new licensure requirements for teachers, provide professional development support to teachers, and to improve recruitment of qualified teachers (Education Daily, 1998).

Because many students enrolling in higher education are underprepared and unable to academically perform satisfactorily at collegiate levels, colleges and universities have established protocol for assessment of basic skills and remedial education programs to serve this underprepared student population. A Chronicle of Higher Education report (Gose, 1997) titled *Tutoring Companies Take Over Remedial Teaching at Some Colleges* describes recent trends of some colleges to outsource remedial instruction on their campuses to private, for-profit service providers such as Kaplan Learning Services and Sylvan Learning Systems. Many colleges across the country have contracted with private-for-profit companies to teach remedial education classes including Chattanooga State Technical College in Tennessee, Greenville Technical Institute in South Carolina, Howard Community College and Towson College

in Maryland, Columbia College in Illinois and the University of California at Berkeley (McClenney, 1988, and Comptroller's Fifth Texas Performance Review). Kay Grastie, Vice President for Education at Greenville Technical College refers to the college's partnership with Kaplan as a public-private collaborative relationship (Grastie, 1999). This collaborative model between the public and private providers allows the college to retain control of instruction. Early analysis of the partnership's success in remediating students is encouraging. Grastie claims that when the public and private sectors have common goals and mutual respect, the college can prosper from private sector involvement without jeopardizing academic freedom and autonomy (Grastie, 1999).

David Arendale, immediate past president of the National Association for Developmental Education (NADE) agrees with Hunter Boylan that there are no techniques or any particular educational delivery modalities employed by Kaplan or Sylvan that will be universally successful (Arendale, 1997). And like Boylan, Arendale supports and indeed welcomes partnerships with Kaplan, Sylvan, and others to help meet the increasing need for remediation in higher education (Arendale, 1997). Similarly, Dolores Perin (1999) supports a partnership between academic and occupational education to improve remedial education. She believes that a lack of connection between the isolated skills of reading, writing, and mathematics and the practical, meaningful application of these skills often results in successful remedial students' continued struggles in reading, writing and mathematics (Perin, 1999). Developing contextual remedial programs and integration across academic disciplines may be a most useful partnership.

The higher education community has responded to the public pressure for an increase in the effectiveness and a decrease in the associated costs of developmental

education. Some of these responses have included outsourcing developmental education to the 'for-profit' agencies, redesigning remediation programs, raising admissions requirements at colleges and universities, raising the minimum performance level on standardized tests to exclude underprepared students from admission to colleges and universities, and eliminating remedial program offerings altogether at four-year colleges (McCabe and Day, 1998). The Texas Comptroller's Office has recommended that state law be amended to require the Texas Higher Education Coordinating Board to allocate appropriations for remedial education to higher education institutions based on the number of students who successfully complete remedial education programs (Texas Higher Education Coordinating Board, 1999).

In the October 24, 1997 issue of the Chronicle of Higher Education, George Findlen proclaims we should not be asking the question "Who should be responsible for teaching remedial courses?" but rather "Which approach to the problem seems to work in a given set of circumstances?" That is, it is not who should be offering developmental or remedial courses, 'for-profit' companies, community colleges, or senior colleges and universities, but what is it that will produce results for the society? (Findlin, 1997). Kay M. McClenney aptly summarized the common problem faced by community colleges during her opening keynote presentation for the League for Innovation 1999 Conference:

> How do you provide effective remedial education to a single mother with three children, a 40-hour per week job, and no transportation, who reads at the 6th grade level (perhaps with limited English proficiency), who has had a lousy experience with schools and suffers from incredibly low self-esteem, and who wants desperately to create a better life for herself and her family. And how do you help this person advance about eight grade levels in a few months with no second chances, use technology only when technology works best, provide human support when only high-touch will do, and ultimately provide documented, quantified (but reader-friendly) evidence of success that only the devil himself could deny? (McClenney, 1999, League for Innovation Conference).

Early Historical Perspectives of Underprepared Students

Underprepared students in higher education are not a recent occurrence. Since the establishment of American higher education, underprepared college and university students have been provided with remediation programs designed to ensure academic success by improving the basic skills required in collegiate-level courses (Rudolph, 1962; Brier, 1984). American colleges and universities set an early precedent of enrolling underprepared students. American higher education has never experienced a time when all students enrolled in college were adequately prepared for the academic rigor of college. Remedial education began at then Harvard College in the 17th century and has been a part of higher education since that time. Early remedial education was provided to underprepared students at Harvard College to tutor students in Greek and Latin (Phipps, et al. 1998).

Developmental education has been a part of the higher educational matrix, beginning with Harvard College in the 17th century and has persisted for over three centuries. No longer do higher educational institutions provide remediation in Greek and Latin languages but the subject matter for remediation is language and math skills. As early as 1849, the University of Wisconsin established a College Preparatory Department to serve its underprepared student population deficient in the basic skills of reading, writing, and mathematics. (Brier, 1984). By 1889, as reported by the National Council of Education, 80% of American colleges and universities had established preparatory departments to provide basic skills training and education to their underprepared students (Brier, 1984). Little had changed by the twentieth century when Martha Maxwell (1985) reported that half of the students enrolled in Harvard, Princeton, and Yale in the early 1900's could not meet basic entrance requirements.

Post World War II

Following World War II, returning GI's, with a need to enter the workforce, were faced with changes in the demands for workplace skills. A differently-prepared workforce was required to match the complexity of post-war American industries. The technology of post-war America demanded increased skills in reading, writing, and mathematics. To match the need for a better prepared workforce, millions of returning GI's required access to higher education to gain the skills required for the new American workforce.

The GI Bill of Rights, passed by Congress in 1944, increased access to higher education for all returning veterans. Colleges and universities admitted veterans who did not meet admission criteria. Yet these veterans often outperformed their younger classmates who were admitted through more selective criteria. This model of academic success provided a basis for continued expansion of educational opportunity and access (McCabe and Day, 1998). The passage of the GI Bill and the subsequent educational opportunities afforded returning World War II veterans was the beginning of the access revolution in higher education.

Influence of Federal Legislation

In addition to veteran demands for access to higher education, women and minorities demanded access and admission to higher education. Federal mandates resulting from the civil rights movement of the 1950's and 1960's forcefully opened the doors of higher education even wider. *Brown vs. Board of Education* in 1954, the Civil Rights Act of 1964, and the Voting Rights Act of 1965, all took direct aim on access and equity in education. As a result, enormous growth in admission to higher education

followed. Between 1960 and 1970, America spent more on the construction of higher education facilities than had been spent in its entire previous history. Expenditures increased seven fold and enrollments tripled (McCabe and Day, 1998). Community colleges proclaimed an egalitarian mission (Ratcliff, 1994). Educational opportunities expanded to include Americans from all races, both genders, and all ethnicities. Students enrolled in higher education from all social and economic backgrounds.

The result of expanded access to higher education is an increase in the numbers of underprepared students. The growing numbers of students admitted into higher education with academic deficiencies presented enormous difficulties for educational institutions. The honorable mandate for open access and equity to higher education gave rise to a much larger population of underprepared students deficient in the basic skills of reading, writing, and mathematics than had ever been experienced in American higher education. Millions of college students, deficient in the basic academic skills, were destined to fail without adequate preparation in those skills.

The Current Underprepared Student Population

The number of underprepared students entering American colleges is staggering and continues to grow (Roueche and Roueche, 1993, Texas Higher Education Coordinating Board, Division of Research, Planning and Finance, 1997). Higher education enrollment is expected to increase from an estimated 13.9 million students in 1995 to 16.1 million by 2007 (McClenney, 1998). Nationally, over forty percent of all students who enroll in community colleges are academically deficient in reading, writing, or mathematics (Smith,, Young, Bae, Choy, and Alsalam, 1997). Underprepared students in higher education are not only those students who enroll in higher education directly out

of high school. Many are non-traditional students whose basic skills in reading, writing, or mathematics have deteriorated from being out of school for a prolonged period of time (Blanchette, 1997). Still others were not enrolled in college preparatory programs in high school and failed to develop the essential skills required to perform at the collegiate level in reading, writing or mathematics (Smith, et al., 1997). Some students in need of developmental studies are those who completed a high school degree or dropped out of high school and immediately entered the workforce only to discover that their basic academic skills did not serve them well. Consequently, many decide to enter college several years later (Smith, 1997). Still others include immigrants to the United States whose primary language is not English and have not developed reading and writing skills in a secondary language.

A 1997 publication by the National Center for Education Statistics (NCES) states that forty-one percent of first-time freshmen are enrolled in developmental education courses at public community colleges. A 1995 NCES survey identified that 78 percent of higher education institutions that enrolled freshmen offered at least one remedial reading, writing, or mathematics course (National Center for Education Statistics, 1996). Of all students enrolled in one year or more of developmental education courses in the United States, fifty-four percent attend public community colleges. Only thirty percent of all students enrolled in developmental studies programs attend public senior colleges and universities, and less than sixteen percent are enrolled in private four-year institutions (National Center for Education Statistics, 1997). Therefore, remediation is and will continue to be a core function of higher education (Phipps, 1998).

Evolving and emerging technologies place a greater demand on new and different skills for workers. These technologies influence the remedial education content and

delivery methodologies. Currently, employed workers find themselves in need of these new and different skills and enroll in higher education only to discover they are deficient in the basic skills of reading, writing, and mathematics as are a large percentage of the adult working population. Because they are underprepared for work, these workers require more education, more skills, remediation in reading, writing, and mathematics to function at a literate level (Brock, 1993). As Judy (1997) and Hodgkinson (1997) point out, demographic trends in America, coupled with the demands for a differently skilled workforce, have led to a continued increase in the number of underprepared workers, and increased enrollments in higher education. As underprepared workers seek postsecondary education to increase skills required in the workforce, enrollment in higher education will steadily continue to increase (Macunovich, 1997). Therefore, open access is critical to social advancement and will be even more so in the next century.

The investment in developmental education is a commitment to the nation and to the development of the human infrastructure essential to the world economy (Brock, 1993). W. E Brock's research studies (1993) indicate that more than twenty-five percent of the U.S. workforce is functionally illiterate. Brock's research is supported by an earlier study from the University of Texas at Austin, which revealed that twenty-percent of adult Americans are functionally illiterate and are not able to perform daily activities requiring reading and basic arithmetic (Northcut, 1975). The only solution for the underprepared worker to ensure the social and economic well-being of all citizens is to increase educational access and opportunity to develop the requisite skills demanded of a globally competitive nation (Judy and D'Amico, 1997).

America must begin to more effectively address the needs of a burgeoning population of underprepared students seeking higher education and skills training. The

problem facing this nation will echo through all sectors of the society and will define what America is to become as a nation (Kent, 1999). According to Roueche, the long-term effects of an increasing population of academically underprepared students, a growing 'underclass' and underserved students will weaken the social and economic fabric of this nation (1993). The prediction of a continued increase in underprepared students and poor student performance as identified in *A Nation at Risk* continues to plague this country. Unless all educational institutions begin to work together to address these issues, the problems will not abate and the country will not be able to produce an educated workforce for the next century (Roueche, 1993).

Laying blame at the doorstep of the public schools does little to address the problem. As Arendale points out, laying blame does not solve the problem, it only fuels more anger (Arendale, 1997). So too, blaming the community colleges for failing to meet the needs of underprepared learners demanding marketable skills and a piece of the American dream, does little to address the problem. Accusing the senior universities of turning their backs to this population of underprepared students serves no constructive purpose. To argue who shall be the preferred provider for remedial education, community colleges, senior colleges or the for-profit education providers does little to meet the needs of these learners.

In her 1995 Presidential Address, *What sociologists are learning about the next generation of students: Are we prepared to teach in the 21st century,* Jane Prather predicts that "the majority of entering college students will not be prepared for university-level work." Further, she states that educators at all levels from K-12 through the universities must collaborate. Educators must abandon the practice of blaming the educational institution at the rung below them (Prather, 1996). Some universities and four-year

colleges have, in an avoidance tactic to eliminate the need for remedial education at their institutions, raised admission requirements to exclude the underprepared student. Community colleges respond by conducting assessment for reading, writing, and mathematics for all students and design remedial courses to meet the needs of the underprepared while demanding educational reform at the secondary level (Roueche, 1993).

In the April/May 1999 issue of the *Community College Journal*, devoted entirely to remedial education, the following quotable quotes are relevant and express the concerns from educators across the nation:

> Scaling back or eliminating remedial education is a cure worse than the disease. Most remedial students need only one or two courses to catch up or refresh their knowledge of a subject, and they have about the same chance of graduating as those who require no remediation. Why, then, would we want to deny access to students who have a very real chance of succeeding? Indeed, the public ought to be reassured that colleges make students complete remedial courses – it's a clear indicator that our higher education institutions are serious about academic performance and standards (Ikenberry, 1999, 48).
>
> We should never let this debate get sidetracked. It is about getting education and services needed for the fastest, most effective remediation possible for the success of our students at all levels- associate degree, bachelor's degree, and in entering or upgrading for the workforce (Thorogood, 1999, 48).
>
> Remedial education is best offered by community colleges. However, because of the large and continuing need for such education, if no community college is available, then the four-year institution must be prepared to offer that training (Anderson, 1999, 48).
>
> Mayor Giuliani's attack on CUNY is built on two misleading sets of statistics. The first is the very high proportion of students entering the University's community colleges who fail the basic skills test in reading, writing, and math. But the fact that our incoming students are not prepared for college is not an indictment of our institutions. . . . we want to be measured not by the skills level of incoming students, but by that of our outgoing students, graduates, and transfers (Bowen, 1999, 48).

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> There are many philosophical arguments why to do or not to do some things, but in the case of building fundamental skills one needs to succeed in higher education, there is only one moral answer. . . . This is not a matter of abstract philosophical debate about who might be best suited to teach certain types of classes. This is about seeing what we can do to help these students build better lives for themselves (McCalla, 1999, 48).

The developmental studies problem is an enormous social crisis and will require all players to partner and develop effective and efficient methodologies to meet the needs of the underprepared students (Kent, 1999). If the country fails to meet this challenge, the consequences will be disastrous and affect the nation's productivity, quality of life, and its ability to compete in a global world. None of the players, including public schools, private schools, community colleges, senior colleges, policy makers, politicians, business and industry, nor the media, can sit idly by and assume that the other will stand up to this challenge (Kent, 1999). The nation can no longer "curse the darkness" and lay blame for a population of underprepared students (Roueche and Roueche, 1999). Norma Kent makes the analogy to the miner's canary:

> In earlier times, the canary was used to test for leaks of deadly gases and other hazardous elements before the miners themselves descended into the murky shaft. The death of the canary presaged peril and signaled a need for extreme caution and thorough exploration. The growing need for remedial education in our classrooms can be viewed as our societal canary. Unheeded, it can be the precursor to a dangerous descent (Kent, 1999, 4).

Melko states that "developmental education is the great equalizer" and "if the United States is to be competitive in the global market, its citizens must be at least as skilled as their international colleagues." Developmental education is the key to ensuring that all our citizenry are able to reach their full academic and personal potential and contribute to the future of the country (Melko, 1998).

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Today, more than half of all workers say they need education and training beyond high school to obtain adequate employment or to remain employed (National Center for Educational Statistics, 1996). In 1950, more than 80% of the available jobs in America were unskilled or semiskilled labor. Today, more than half of the available jobs in America require skilled workers. By the year 2010, 85% of all jobs in America will require a skilled worker or professional (National Center on Education and the Economy, 1990). In a report from the National Association of Manufacturers (1997) ninety-six percent of those responding to the survey indicated they provide education and training for their hourly employees in reading, writing, problem solving, and mathematics (National Association of Manufacturers, 1997). As work requirements have increased, so have the skill levels required of the American worker. Therefore, predictions are that the number of students requiring remediation in reading, writing, and mathematics will also increase as learners seek the skills necessary to gain meaningful employment (McCabe and Day, 1998).

Other factors contributing to an expected enrollment increase in higher education include changing demographic trends; an increase in the number of children living in poverty; immigration patterns; and the changing nature of the workforce (Statistical Yearbook of Immigration and Naturalization Service, 1992). A concomitant increase in enrollments in developmental education courses is expected. Of all the factors that influence academic deficiency, poverty has the strongest correlation to academic failure (Hodgkinson, 1997).

Many educators and legislators simply do not understand what developmental education is, its role in higher education, and its benefits to society (Boylan, 1995). To understand, Boylan presents a distinction between remedial and developmental

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education. The College Reading and Learning Association have adopted these definitions (Carriulo, 1994). Developmental education is education designed to teach skills to learners that have not previously been taught. Remedial education implies that the skills have been taught but not learned correctly and therefore must be re-taught. Developmental studies are the integration of academic development with remedial instruction (Boylan, 1995). Developmental education may incorporate remedial instruction. Since the term remediation implies a wasted time and expense, policy makers, legislators and reformists are quick to call for reformation and an end to remedial education.

Historically, underprepared students in American universities were offered remedial education or pre-college level courses in reading, writing, and mathematics. These courses were designed to compensate for deficiencies in prior learning of the basic skills. John E. Roueche and Suanne D. Roueche (1999), although acknowledging the evolution of remedial education to a more complex, holistic approach and the inclusion of developing the cognitive and affective traits of students, choose to use the term remedial education rather than developmental education. Although the term *remedial education* carries a negative connotation from a long history of appropriateness in higher education, cost to the tax payer, implicit indictment of secondary educational programs and public schools, it is more widely understood outside the educational community (Roueche, 1999).

Griffith and Connor stated "What we have come to call remedial work is, in fact, an ongoing necessity in a pluralistic society." Developmental studies is not a remedy for poor school systems or underprepared students, it is essential if America is to extend educational opportunity to all its residents. (Griffith and Connor, 1989).

Developmental Education: A Systems Approach

The Texas Higher Education Coordinating Board (THECB) Chapter 5, subchapter P, Testing and Remediation, defines Developmental Education as follows:

> Developmental Education for the purposes of this subchapter is defined as courses, tutorials, laboratories, or other efforts to bring student skill levels in reading, writing, and mathematics to entering college level.

As educational research identified factors that influence academic performance, it became apparent that remediation alone was insufficient to prepare an underprepared student for college-level performance. Educators realized that personal autonomy, self-confidence, freedom from racism and genderism, study skills and behaviors, motivation, social, and interpersonal skills also influence academic achievement, retention, and graduation (Astin, 1977; Chickering, 1969). Boylan (1995) points out that "students fail to do well in college for a variety of reasons and only one of those reasons is lack of academic preparedness." Educators began to understand the necessity for offering a wide range of support services in addition to the basic skills programs for underprepared students. This integration of personal and academic development with remedial instruction became known as developmental studies (Boylan, 1995). Today, developmental education includes an array of student support services including academic and personal counseling, application and use of tutorial centers, assessment and early intervention techniques, learning theories, student mentors, advisement, financial counselors and financial assistance programs which all combine with remediation to define the developmental studies programs.

John and Suanne Roueche's latest book, *High Stakes, High Performance: Making Remedial Education Work*, offers a systematic best-practices prescription for successful remedial education programs which includes increasing structure and support for

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remedial education students; requiring working students to work fewer hours; providing more comprehensive financial aid programs; establishing peer and faculty mentor and support groups; and requiring an integration of literacy activities in all courses and in all disciplines (Roueche and Roueche, 1999). The only common pattern identified in the Roueche research was that American community colleges offer remedial courses. There was little commonality in program design, implementation, or evaluation of success (Roueche and Roueche, 1999). The approach for designing a successful developmental education program, as opposed to stand-alone or sequentially isolated courses in reading, writing or mathematics, should include a plan to improve student performance and involvement with higher education providers and the public schools beginning in Kindergarten through twelfth grade (Roueche and Roueche, 1999). Roueche contends that it is only through collaboration between higher education and K-12 that the greatest potential will be realized to implement effective remedial education programs (Roueche and Roueche, 1999 and Baker, 1994).

Underprepared students are labeled as 'at-risk' students implying that their chance of academic success is less than ideal and that their failure rate is exceptionally high. These at-risk students need additional student support services beyond that of the traditional college student. They need more structure and organization to ensure academic success (Roueche and Roueche, 1999). Therefore, community colleges must identify best-practices, adopt and adapt successful program design of other colleges and take seriously the mission of the open door to provide access with excellence (Roueche and Roueche, 1999). In a recent Community College Journal article, *Keeping the Promise: Remedial Education Revisited,* the Roueche's state that there is "precious little evidence to suggest that our community colleges are succeeding in their mission to make

good on the promise of the open door" (Roueche and Roueche, 1999).

Roueche offers that the reluctance of community colleges to establish standards and prerequisites that would improve student success in remedial courses may be out of fear that these practices would also reduce access. More rigorous academic policies and procedures, in fact, increase student success and build enrollments, says Roueche (Roueche and Roueche, 1999). Placing greater expectations and accountability for learning, defining standards, and incorporating effective program design features to serve up remedial education with both egalitarian access and excellence is the mission of community colleges (Roueche and Roueche, 1999). In a report titled *"Climbing Out from Between a Rock and a Hard Place: Responding to the Challenges of the At-Risk Student"*, Roueche identifies his ten recommendations for developmental studies programs to better serve the needs of at-risk students. (Roueche, 1994).

A 1991 report by the National Center for Research in Vocational Education (NCRVE) to the U.S. Congress, the Secretary of Education and the Secretary of Labor titled "Readin', Writin' and 'Rithmetic One More Time: The Role of Remediation in Vocational Education and Job Training" makes it clear that remediation is vital to successful workforce education and job training (Grubb, et al.., 1991). This report further states that very little data and information about developmental studies program effectiveness are available.

A thorough evaluation of developmental studies programs is required to identify efficient practices, effective programmatic designs, and successful instructional methodologies. Colleges and universities offering developmental studies programs must begin to identify the effectiveness of these programs in meeting the needs of its learners. Ineffective developmental education programs do little to prepare the individual for the

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workforce, are damaging to the educational institution, and consume valuable resources. It is only through programmatic evaluation than an institution can identify model evaluative practices that are effective for specific learners and improve these programs of study. Effective educational programs contribute to the nation remaining globally competitive, reversing the growth of a permanent underprepared and disenfranchised underclass, and developing a workforce with the skills required in the twenty-first century (McCabe and Day, 1998 and McCabe, 1999).

Higher education must meet a social obligation to ensure student success. This can only be accomplished through the implementation of effective developmental education programs designed for student success. Baker and Reed (1994) identified the dichotomy between the demands for worker skills and an unskilled underprepared population. They concluded that a well-structured educational response is necessary to create a "world class" workforce. Without a restructured educational process committed to success for all learners in the basic skills, America will not be able to compete globally and will never address the inequities and social ills of its society (Baker, and Reed, 1994). American students who are underprepared in reading, writing, and mathematics will not have the skills required of the workforce of tomorrow without effective, efficient, and accessible developmental education programs to teach the basic reading, writing, and mathematics skills.

Enrollment and Funding for Texas Developmental Education Programs

Enrollment in remedial courses in Texas public higher education institutions has markedly increased since the 1986-87 base years through the present (Appropriations for Developmental Education in Texas Public Institutions of Higher Education, 1998). In the cover letter from Commissioner Don Brown that accompanied this report, the

Commissioner states the importance of continuing to improve the effectiveness of developmental education. General revenue appropriations for developmental education in Texas increased from $38.6 million in the 1988-89 biennium to $172 million in the 1998-99 biennium, representing an increase of 346 percent (Texas Higher Education Coordinating Board, March, 1998). Furthermore, general revenue appropriated by the state does not include local funds generated by tuition and fees. Semester credit-hour enrollments at public universities in the state during the 1996-97 funding base-year increased by 44% over the 1986-87 base year. During this same period, semester credit-hour enrollments for academic instruction excluding developmental courses increased by only 12 percent. Texas community colleges report a 307 % increase in contact hours generated for developmental education courses between the 1986-87 base year and the 1996-97 base year. During the same time period, contact hours for non-developmental education courses increased by only 53% in Texas public community colleges. Developmental education appropriations for Texas community colleges during the 1996-97 base year represents 11.5% of all instruction, while at public universities, only 2.8%. Community colleges received 84.6% of the total appropriation for developmental education. Appropriations for the 1998-99 biennium supporting developmental education instruction in Texas community colleges is $172 million, a growth of over $133 million since 1988-89. Clearly, the growth in developmental education student enrollment is outpacing all other higher education course enrollments. The General Revenue Appropriations for Remedial Education for the 1998-1999 biennium in Texas for universities was $16.9 million (10.5%). In contrast, the funding for remedial education in Texas community colleges was $138.5 million or 86.2% of total revenue expenditure for the state as reported in the final staff draft *Making remedial education funding*

performance-based (Texas Higher Education Coordinating Board, 1999). Clearly community colleges are the major provider of developmental education in Texas.

This 1999 THECB report cites the 1996 study by Hunter Boylan, Director of the National Center for Developmental Education, entitled *An Evaluation of the Texas Academic Skills Program*. Dr. Boylan's summary of this study, as reported in the Texas Higher Education Coordinating Board 1999 Final Staff Draft, states that the overall quality of remedial programs in Texas was poor. The report further states that:

> Texas emphasized compliance with the law rather than outcomes of remediation. Many remedial programs relied on adjunct and poorly trained faculty who did not participate in professional associations or use latest research in best-practices reported in professional literature. . . .Only a small number of faculty members had any graduate training in how to work with underprepared students. . . Program lacked clear goals and expectations and seldom engaged in ongoing, systematic self-evaluations. . . .Many programs lacked documentation to track student results over time, which could offer a basis for program improvements. . . Programs tended to apply a one-size fits all mentality, with instruction that was not tailored to the needs of the individual students. . . .Many campus environments bred negative attitudes toward and among remedial students. Comments from college administrators, as well as students, did not reflect a proper understanding or appreciation of the purpose, goals, and value of remedial education. Boylan, 1997).

As a result of this study, the 1997 Texas Legislature required the Texas Higher Education Coordinating Board (THECB) to evaluate the effectiveness of its developmental education programs and to publish a "best practices" report to guide colleges and universities in program improvement. However, the final draft report, *Making remedial education funding performance-based,* cited the lack of any incentives for community colleges, public universities, or colleges to change their existing developmental education programs. Since the colleges in Texas are funded on semester credit hours and contact hours, the report recommends that performance funding or incentive funding could be attractive to force program evaluation and improvement or

provide the incentive to contract with external private for-profit agencies (Texas Higher Education Coordinating Board, 1999).

> The recommendations are:
>
> State law should require the Texas Higher Education Coordinating Board to allocate all general revenue appropriations for remedial education to higher education institutions based on the number of students who successfully complete remedial education during the previous fiscal year. . . . State law should eliminate
>
> the Remedial Education Program Performance Fund, trusteed to the Texas Higher Education Coordinating Board (Texas Higher Education Coordinating Board, 1999).

The National Center for Developmental Education, under contract to the Texas Higher Education Coordinating Board, published a Self-Evaluation Guide entitled *Evaluating for Improvement, Self-Study Guidelines for Developmental Education Programs in Texas Public Colleges and Universities,* (September 1998). Under the direction of Hunter Boylan, the study revealed what is purported to be "best-practices" in Texas developmental education programs. Boylan reveals that Texas developmental education programs have not collected the formative data that can be useful in program improvement. Formative evaluation takes place during the design, implementation and delivery phases of program and asks the relevant questions to determine what is working and what is not working. Formative data are therefore used to improve program delivery. With a lack of the formative baseline measure of what worked well and what did not work well, Texas developmental education programs are not able to identify best-practices. The Self-Study Guidelines, developed by the National Center for Developmental Education, were designed to assist developmental educational programs in Texas collect formative data and use those data for program improvement (Boylan, 1998).

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In order to know if developmental education program effectiveness has improved, it is imperative that all institutions of higher education offering developmental education programs measure their effectiveness.

Role of Community Colleges in Developmental Education

Data from the 1995 report of Remedial Education at Higher Education Institutions from the U.S Department of Education, National Center for Educational Statistics, state that community colleges enroll a greater population of developmental studies students than senior public colleges and universities. In 1995, 100% of 2-year public colleges taught remedial courses in reading, writing or mathematics as compared to 4-year public colleges who only offered reading, writing, or mathematics at 81 % of their institutions. These are not surprising data, since community colleges have a broader mission than do senior colleges and universities. In addition to offering lower division academic courses, community colleges offer technical certificates and associate degrees, maintain an open door admission policy, serve a large part-time student population, and enroll students more likely to come from academically and economically disadvantaged backgrounds (McCabe and Day, 1998). The open door policy of community colleges provides an unobstructed pathway to higher education for all learners, including the underprepared student. Underprepared students seeking admission into the nation's open door community colleges are seeking a better quality of life and reentry into society. It is the open door policy of community colleges that makes reentry possible. Indeed, remedial courses in writing, reading, and mathematics are the most offered courses in community colleges (Roueche, 1968, Roueche and Roueche, 1993).

Therefore, it is expected that community colleges will have a greater percentage of academically underprepared students than senior institutions. Robert H. McCabe, in

his address to community college presidents at the American Association of Community Colleges 1999 fall meeting, emphasized the increasing demand for effective remedial education programs in the nation's community colleges. He stated that "America has no one to waste" (*Community College Times*, November 16, 1999) and again during the January 27, 2000 Texas Higher Education Coordinating Board *Starlink* presentation, *Teaching Developmental Education: Policy and Pedagogy*, McCabe restated that the nation has "no one to waste" and that "most colleges do not use what they already know." He encouraged all colleges offering developmental studies programs to emulate successful remedial programs by extending enrollment and pre-enrollment periods; abolish late registration; assess and institute mandatory placement; eliminate simultaneous enrollment in academic courses; encourage working students to either reduce their work week or enroll in fewer developmental credit hours; provide greater financial assistance; eliminate a series of courses; establish peer and faculty mentors and support groups; require literacy activities in all courses and in all disciplines; provide time for skill practice; and employ collaborative efforts to learning (McCabe, January 27, 2000). When asked during the broadcast by a viewer to define "successful remediation", he replied "it has to be a program, not a series of courses and it must be integrated through the entire institution". He emphasized that "content is not the question, it's a matter of delivery."

McCabe was quoted in the *Community College Times*, "If remedial education is discontinued, we will be overwhelmed with the cost of supporting people" (*Community College Times*, November 16, 1999). Demographer Harold L. Hodgkinson, Director of the Center for Demographic Policy, states by the year 2040, the number of people over the age of 80 will exceed the number of preschool children. McCabe's message to the

AACC membership is that community college presidents must encourage the establishment of effective remedial education programs to serve an increasing demand for a skilled labor force. The community colleges, with their diverse missions, are the most logical placement for remedial education programs and skills development (*Community College Times*, November 16, 1999).

Texas instruction at the university level is measured in semester credit hours. The 1998 Appropriations for Developmental Education in Texas Public Institutions of Higher Education Report that semester credit hours offered by public universities in developmental education for the 1996-97 base year was 44% higher than the number of semester credit hours offered during the 1986-87 base year (Appropriations for Developmental Education in Texas Public Institutions of Higher Education, 1998). In contrast during the same base year periods, lower division semester credit hours other than developmental education increased only twelve percent. The total developmental education semester credit hours offered at the university level in Texas represents 2.2 percent of all lower division course instruction for the 1986-87 base year and 2.8 percent of all lower division course instruction for the 1996-97 base year. Although the demand for developmental education course-based instruction has increased at the university level, it pales in comparison to the demand at the community college level.

Community colleges are "democracy's colleges' and "America's social inventions" (Roueche and Roueche, 1999). As such, community colleges are held accountable to provide effective developmental education programs. The performance of most developmental studies programs across the country are considered ineffective, costly, duplicative, and are increasingly challenged by law-makers and the general public to demonstrate effective results (Roueche and Roueche, 1999).

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During the American Association of Community Colleges (AACC) convention, John and Suanne Roueche presented a summary of their recent book entitled "High Stakes, High Performance: Making Remedial Education Work. During this presentation John Roueche, Director of the Community College Leadership Program (CCLP) at the University of Texas at Austin stated that community colleges are not performing as well as they should in delivery of remedial instruction (Lazarick, 1999). Roueche commented that many community colleges are not able to document the success rates of their remedial education courses as defined by enrollment in successive courses. Roueche also alluded to the dichotomous view that although community colleges are recognized as the provider of choice for delivery of remedial education courses by legislators and policy makers, these same community colleges are often 'looked down upon" for providing remedial courses. Roueche's comments lead us to the conclusion that we can no longer afford to ignore the issue that effective remedial education programs must be designed and evaluated for their effectiveness. All of American society must address these concerns no matter how distasteful it may be to discuss the need for remedial education. Community college professionals must acknowledge the needs of these learners. Stanley Ikenberry (1999), "The Truth About Remedial Education" states:

> Let's be candid: Remedial education is unpopular. I never met a state legislator, reporter, or parent who likes it. I never met a student who liked being assigned to remedial English. Nor have I ever met a professor who enjoyed teaching remedial education courses (Ikenberry, 1999, 8).

Suanne Roueche, Director of the National Institute of Staff and Organizational Development, stated that community colleges that offer remedial education are thought of as "remedial" themselves (Lazarick, 1999). She emphasized that the need for remedial education has increased dramatically since the 1960's when high school graduates were reading at the 10th grade level, adding that in the 1990's high school graduates read at the

8th grade level. (Lazarick, 1999). The Roueche's emphasized that community colleges perform an adequate assessment of incoming freshman skills in reading, writing and mathematics but then often do a poor job in tracking the success of remedial studies students. They warned the community colleges that if they don't do a better job in documenting the success of their remedial programs and improve the success rates of remedial students that the community colleges will not continue to be the provider of choice. John Roueche warned that if community colleges fail to document and improve their remedial education programs, the provider of choice would be the 'for-profit' institutions such as Sylvan and Kaplan Learning Centers. (Lazarick, 1999). Furthermore, community colleges will not qualify for federal grants programs if they fail to document the success of their remedial education programs as required by the Government Performance and Results Act. (Lazarick, 1999).

Community colleges must begin to document the effectiveness of their developmental studies programs and share best practices. The National Center for Education Statistics report of 1996 identified that all community colleges offer developmental studies courses, however, few have measured effectiveness of these courses to prepare students for academic success in college-level courses (National Center for Education Statistics, 1996). As Roueche points out, the interest in remedial education from policymakers, legislators, the general public and from within the higher education community is critical and hostile (Roueche and Roueche, 1999). The media attention has forced lawmakers, state and federal politicians, and the general public to ask critical questions about the effectiveness of remedial education programs, associated costs, appropriateness of placement in higher education, and responsibility and accountability.

The 1998 report from the Texas Higher Education Coordinating Board, Division of Research, Planning and Finance supports its claim that "developmental education stretches thin the limited funds available to higher education." The July 1999 report from the Texas Higher Education Coordinating Board entitled "*The Effectiveness of Developmental Education at Texas Public Institutions of Higher Education*", cites Section 51.306 of the Texas Education Code which requires all public institutions of higher education to provide developmental education to students unable to pass one or more sections of the Texas Academic Skills Program or TASP test. This report proclaims the "Texas Academic Skills Program" or TASP as a statewide skills-assessment and developmental education program for students enrolled in public colleges and universities. The TASP program purports to assess skills in reading, writing, and mathematics. The goal of the TASP program is "to ensure that students in Texas public institutions of higher education can perform college-level work and can succeed in completing degree and certificate programs" (Texas Higher Education Coordinating Board, July 1999). This report defines "college-readiness" as passing the TASP test.

Of the 132,921 freshman (full-time and part-time) entering Texas public universities and colleges, 104,716 (78.8 percent) took the TASP test. Among those who took the TASP test, 54% (56,403) failed one or more sections in reading, writing, or mathematics and were therefore declared not college-ready and referred to developmental studies course(s) for remediation. The Coordinating Board-funded study sought to answer the question "To what extent did developmental education succeed in making a cohort of developmental education students college-ready as indicated by the pass rate on the re-take of the TASP section or sections failed in reading, writing, and/or mathematics? (Texas Higher Education Coordinating Board, July 1999). The Texas

Higher Education Coordinating Board (THECB) study concluded that of the 56,403 entering freshman-cohort of the summer and fall 1998 semesters, 9,010 students enrolled in developmental mathematics. Of these 9,010 developmental mathematics students, 43 % passed the TASP test on their second attempt sometime within a two-year period of time from initial entry into college. Fifty-seven percent of students enrolled in developmental reading courses for this cohort passed the second attempt reading section of the TASP test within two years from initial entry. The percent of students enrolled in developmental writing courses for this cohort that passed the second attempt writing section of the TASP test within two years from initial entry into college was 70%. The study also revealed that at least forty percent of the students failing one or more sections of the TASP test did not retake the test a second time within two years.

In a 1997 study conducted by the National Center for Developmental Education, *An evaluation of Developmental Education in Texas Public Colleges and Universities,* Hunter Boylan distinguishes between the *relatively underprepared* and *absolutely underprepared* developmental studies students. The *relatively underprepared* students are defined as those who may lack skills in one area as measured by the Texas Academic Skills Program (TASP) test. Boylan includes in this *relatively underprepared* student group those students who may have failed more than one section of the TASP test but whose scores were close to passing. Boylan's research suggests that *the relatively underprepared* student has a good chance of being successful in college. In contrast, *absolutely underprepared* students are defined as those students who fail more than one section of the TASP test and who have scores below 180 on one or more sections of the test. These *absolutely underprepared* students are not likely to be academically

successful in college without substantial developmental education courses (Boylan and Saxon, 1997)

Community college administrators are held accountable to the residents of the state and local community and must begin to conduct systematic assessments that document program efficiency and effectiveness. Since community colleges enroll over one-half of all undergraduates in public higher education, community colleges with open door admission policies, multiple mission statements, great diversity and ease of access must design and evaluate the effectiveness of remedial education (McCallan, 1997).

The July-September 1999 quarterly newsletter from the Texas Higher Education Coordinating Board outlined the rule amendments that were adopted as emergency measures by the Board. The rule amendments require all public institutions of higher education offering remedial education to adopt a written developmental education plan for the assessment and placement of new undergraduate students. The developmental education plan must include student pathways through developmental education, student advising programs, developmental education deferral option, provisions for transfer, and exceptional enrollment measures.

In summary, a study of the developmental education programs at North Harris Montgomery Community College District is important because it will provide a formative evaluation and serve as a basis for summative evaluation and subsequent design of a more efficient and effective delivery of developmental studies education. The ultimate measure of successful developmental studies courses is that of academic success in collegiate level mathematics and or English courses, hence college-readiness.

CHAPTER THREE

Research Methodology and Procedures

Methodology

This study is a quantitative, longitudinal, and fixed cohort analysis of the North Harris Montgomery Community College District's (NHMCCD) developmental studies courses and programs beginning in the fall 1992 semester through the spring 1998 semester. For the purposes of this study, all students included in a given cohort are those who have enrolled in the developmental studies course or courses defined by that cohort for a given semester.

A cohort is defined as those students enrolled in the designated course or courses for a given semester. For example, Cohort 1 consists of all students enrolled in ENGL 0305, Developmental Reading I only. All students in Cohort 1 were not enrolled in any other remedial courses during the initial term. Cohort 7 consists of all those students enrolled in both ENGL 0306 (Developmental Writing I) and MATH 0306 (Pre-Algebra) during the initial term. All students in cohort 7 were not enrolled in any other developmental studies courses during that term.

All First Time In-College (FTIC) students are assessed for reading, writing, and mathematics skills using the Assessment of Skills for Successful Entry and Transfer (ASSET) test. Based on individual assessment scores, students are enrolled in the appropriate level of English and/or mathematics courses. Students who score below the placement score for either college-level English of college-level mathematics are placed into developmental courses appropriate for their skill-level.

Cohorts, for the purpose of this research study, were selected to include those students enrolled in only the lowest-level developmental reading, lowest-level developmental writing and lowest-level developmental mathematics courses. Additional cohorts were selected to include only those students enrolled in the highest level developmental courses as well as combinations of multiple developmental courses across all levels. Comparisons of persistence and success for each cohort were conducted to determine if there was any significant difference of persistence or success rates of different cohort groups as compared to control groups.

The reporting period for each cohort is defined as the period of time from the initial term in which the students are enrolled in the defined courses through the spring 1998 term. For example Cohort 1-92FA consists of those student enrolled in ENGL 0304 only during the initial term, fall 1992 semester. These students were then followed for academic success and persistence through to the spring 1998 term. Students enrolled in ENGL 0304 only were identified for twelve initial terms (cohorts) beginning fall 1992, spring 1993, fall 1993, spring 1994, fall 1994, spring 1995, fall 1995, spring 1996, fall 1996, spring 1997, fall 1997, and spring 1998 terms (semesters). The data from each of these common cohorts were aggregated in order to analyze overall persistence and success. The aggregate is defined as a *Cohort Cluster.* Therefore, Cohort Cluster 1 includes all cohort members enrolled in ENGL 0304 only for all cohort terms.

Although the summer semester enrollment data for all cohorts were obtained, the numbers for each cohort were insignificant and omitted from the study for clarity.

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Table 1 identifies the Cohort Cluster numbers and assigned courses.

Table 1
Cohort Cluster Number and Assigned Courses

COHORT #	ENGL 0304	ENGL 0306	MATH 0306	ENGL 0305	ENGL 0307	MATH 0310	ENGL 1301	MATH 1314
1	*							
2		*						
3			*					
4				*				
5					*			
6						*		
7		*	*					
8	*	*						
9	*	*	*					
10					*	*		
11				*	*			
12				*	*	*		
13							*	
14								*

All student enrollment and performance data were extracted from NHMCCD's District's *Student Information System.* The data were then downloaded, transferred, and aggregated using Visual FoxPro®, a database and analysis tool. The summative tables were created using Visual FoxPro®. The detailed computer programs join the information from the cohort file and student transcripts and analyze courses taken by each student for each term from the initial cohort term through the spring 1998 semester. The final output from these computer programs is the longitudinal history of student success and persistence in the identified and subsequent courses throughout the reporting period.

Research Design

North Harris Montgomery Community College Dsitrict (NHMCCD) is a multiple college district composed of four colleges, five extension centers and The University Center. NHMCCD is located in northern Harris County and Montgomery County and the Gulf Coast region of Southeast Texas. NHMCCD serves over 5% of the community college students in Texas with a full-time student enrollment in excess of 26,000 students per semester and an additional 22,000 community education students.

This quantitative longitudinal study includes all First-Time-In-College (FTIC) developmental studies students enrolled at North Harris Montgomery Community College District in one or more developmental studies courses by cohort year beginning in the fall 1992 semester through the spring 1998 semester.

All students in these defined cohorts have been assessed for reading, writing, and mathematics skills using the Assessment of Skills for Successful Entry and Transfer (ASSET) scores beginning in fall 1992 to the present time. ASSET scores are used to identify specific course enrollment into either developmental or collegiate-level courses in English and/or mathematics.

This study determines student success and persistence rates in each Cohort Cluster and subsequent success in collegiate-level English and mathematics courses as compared to control groups. Success rates are defined as completion of the course with an earned grade of "C" or better. Persistence is defined as successful completion of a developmental studies course accompanied by enrollment in Composition and Rhetoric I (ENGL 1301) and/or College Algebra (MATH 1314).

Additionally, the study determines time to completion, relationships between entry ASSET scores, entry level of deficiencies, and the number of semester credit hours

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attempted and completed for all students defined by each Cohort Cluster for each term. Data collected for each semester, fall 1992 through spring 1998, for each cohort include but are not limited to the following:

1. Number of developmental studies students enrolled for each term,
2. Number and percent of developmental studies students who complete the course successfully over the reporting period,
3. Number and percent of developmental studies students who withdrew from the course,
4. Number and percent of developmental studies students who receive an incomplete grade (I) or a grade of In-Process (IP),
5. Number of developmental studies semester credit hours attempted and number of developmental semester credit hours successfully completed,
6. Number of academic semester credit hours attempted,
7. Average number of semesters to successfully complete developmental courses for each Cohort Cluster and
8. Average number of semesters to successfully complete English 1301 and/or Mathematics 1314 for each cohort.

Table 2 identifies the developmental studies courses in reading, writing, and mathematics and their associated course rubric and course number.

Table 2
Developmental Studies Course Identification

Rubric	Number	Course Title	Level
ENGL	0304	Developmental Reading I	Lowest Remedial Reading Course
ENGL	0305	Developmental Reading II	Highest Remedial Reading Course
ENGL	0306	Developmental Writing I	Lowest Remedial Writing Course
ENGL	0307	Developmental Writing II	Highest Remedial Writing Course
MATH	0306	Pre-Algebra	Lowest Remedial Math Course
MATH	0310	Intermediate Algebra	Highest Remedial Math Course

CHAPTER FOUR

Analysis of the Data

This study determined if the developmental studies courses offered at North Harris Montgomery Community College District prepared students for academic success in college-level English and/or mathematics as compared to a control group. The control is composed of all students who were not enrolled in any developmental courses and enrolled in ENGL 1301 and/or MATH 1314, college-level English and/or mathematics courses respectively. The study is a quantitative, longitudinal, fixed cohort analysis of the academic performance of developmental studies students over twelve consecutive semesters (Fall 1992–Spring 1998). Enrollment data for the summer semesters, although obtained, were omitted from the study since the numbers were insignificant.

Table 3 identifies the developmental studies courses by rubric, number and title.

Table 3
Developmental Studies Course Identification

Rubric	Number	Course Title	Level
ENGL	0304	Developmental Reading I	Lowest Remedial Reading Course
ENGL	0305	Developmental Reading II	Highest Remedial Reading Course
ENGL	0306	Developmental Writing I	Lowest Remedial Writing Course
ENGL	0307	Developmental Writing II	Highest Remedial Writing Course
MATH	0306	Pre-Algebra	Lowest Remedial Math Course
MATH	0310	Intermediate Algebra	Highest Remedial Math Course

Table 4 identifies the cohort cluster number and the developmental studies courses included in that cohort cluster by rubric and number. Cohort's clusters 13 and 14

are the control groups composed of students not enrolled in any developmental courses and enrolled in ENGL 1301 and MATH 1314 respectively.

Table 4
Cohort Cluster Number and Courses Composition

COHORT #	ENGL 0304	ENGL 0306	MATH 0306	ENGL 0305	ENGL 0307	MATH 0310	ENGL 1301	MATH 1314
1	*							
2		*						
3			*					
4				*				
5					*			
6						*		
7		*	*					
8	*	*						
9	*	*	*					
10					*	*		
11				*	*			
12				*	*	*		
13							*	
14								*

English 1301, Composition and Rhetoric I, is considered by the Texas Higher Education Coordinating Board the first reading and writing intensive course at college-level. MATH 1314, College Algebra, is the first common college-level course in mathematics. Hence these first two college-level academic courses, ENGL 1301 and MATH 1314, serve as the control group.

For the purposes of this study, success is defined as completion of a course with an earned final grade of "C" or better. The study compares the success rates of developmental students completing a developmental course or course sequence and

subsequently enrolling in a college-level course to the success rates of students enrolled in college-level English and/or mathematics course who did not require developmental education.

All data were extracted from NHMCCD's District's *Student Information System*. The data were then downloaded, transferred, and aggregated using Visual FoxPro®, a database and analysis tool. The summative tables were created using *Visual FoxPro®*.

A *Cohort Based Tracking Report Summary* table was prepared from the requisite data for each of the fourteen cohorts. This *Cohort Based Tracking Report Summary* identifies for each cohort the cohort sample size (N), percent and absolute number of students in each cohort who passed the course with a "C" or better; percent and absolute number of students in each cohort who received a final grade of "D" or "F" in the course; percent and absolute number of students in each cohort who received a final grade of "W" (withdrawal) in the course; and percent and absolute number of students in each cohort who received a final grade of "I" (Incomplete) or "IP" (In-Progress) in the course. Some students may repeat the same course during the reporting period and therefore the total number of student enrollments may exceed the initial cohort cluster sample size (N).

The *Cohort Based Tracking Report Summary* also provides the percent and absolute numbers of students for each cohort that enrolled in the next sequential developmental studies course, thus providing a measure of persistence. Persistence is defined as successful completion of a developmental studies course (Final grade of a "C" or better) accompanied by enrollment in the next successive developmental studies course in sequence.

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Research Questions and Analysis

Research Question 1

What is the success rate of First-Time-In-College (FTIC) students enrolled in only ENGL 0304 (Developmental Reading I), or only ENGL 0306 (Developmental Writing I), or only MATH 0306 (Pre-Algebra) between fall 1992 to spring 1998?

Cohort Cluster 1: ENGL 0304 (Developmental Reading I only). Cohort cluster 1 includes all students enrolled in only ENGL 0304 in the initial term and followed through the spring 1998 term. The sample size of cohort cluster 1, students enrolled in ENGL 0304 only, was 249 (N=249). Table 5 includes all students enrolled and the final grades recorded for cohort cluster 1 members expressed in absolute numbers and relative percent. Table 5 illustrates that of the 249 students enrolled in ENGL 0304, 65.06 % (162) passed the course at some time over the reporting period.

Of the 162 students who passed ENGL 0304, 76 (30.52 %) ever enrolled over the reporting period in the next sequential English course, ENGL 0305. Of the 76 students ever enrolled over the reporting period in ENGL 0305, 44 (17.67 %) ever passed the course with a "C" or better. Three (3) of the 76 students ever enrolled in ENGL 0305 and received a "D" or "F" for a final grade (1.20%) while 15 (6.02%) received a "W", and 14 (5.62%) received an "I" or "IP" grade at some time during the reporting period.

Of all cohort cluster 1 students ever enrolled in ENGL 0304 over the reporting period, 16 out of 249 (6.42%) ever enrolled in and passed ENGL 1301 at some time during the reporting period.

Table 5
Cohort Cluster 1: Students Enrolled in Developmental Reading I Only

ENGL 0304			Subsequent Courses			
			ENGL 0305		ENGL 1301	
Grade	N	Percent	N	Percent	N	Percent
Pass	162	65.06	44	17.67	16	6.42
D or F	9	3.61	3	1.20	8	3.21
W	46	18.47	15	6.02	14	5.62
I or IP	41	16.46	14	5.62	0	0.00
Total *	258	103.61	76	30.52	38	15.26

Note: Some students may repeat the same course during the reporting period and therefore the total number of student enrollments may exceed the initial cohort cluster sample size (N = 249). Cohort sample size is "headcount" whereas "total" is enrollments.

Cohort Cluster 2: ENGL 0306 (Developmental Writing I only). Cohort cluster 2 includes all students enrolled in only ENGL 0306 in the initial term and followed through to the spring 1998 term. The sample size of cohort cluster 2, students enrolled in ENGL 0306 only, was 504 (N=504). Table 6 includes all students enrolled and the final grades recorded for cohort cluster 2 members expressed in absolute numbers and relative percent. Table 6 illustrates that of the 504 students enrolled in ENGL 0306, 63.88 % (322) passed the course at some time over the reporting period.

This cohort cluster 2 (ENGL 0306 only) demonstrates a success rate of 63.88 percent over the reporting period. Of the 322 students who passed ENGL 0306, 184 (36.50 %) ever enrolled over the reporting period in the next sequential English course ENGL 0307 (Developmental Writing II). Of the 184 students ever enrolled over the reporting period in ENGL 0307, only 19.84 % or 100 ever passed the course with a C or better. Four (4) of the 184 students ever enrolled over the reporting in ENGL 0307 received a "D" or "F" for a final grade (0.79%) while 37 (7.34%) received a "W", and 43 (8.53%) received an "I" or "IP" grade.

Table 6
Cohort Cluster 2: Students Enrolled in Developmental Reading I Only

	ENGL 0306		Subsequent Courses			
			ENGL 0307		ENGL 1301	
Grade	N	Percent	N	Percent	N	Percent
Pass	322	63.88	100	19.84	55	10.91
D or F	14	2.77	4	0.79	28	5.55
W	112	22.2	37	7.34	23	4.56
I or IP	101	20.03	43	8.53	0	0.00
Total	549	108.92	184	36.50	106	21.03

Note: Some students may repeat the same course during the reporting period and therefore the total number of student enrollments may exceed the initial cohort cluster sample size (N = 504). Cohort sample size is "headcount" whereas "total" is enrollments.

Of all cohort cluster 2 students ever enrolled in ENGL 0306, 55 out of 504 (10.91 %) ever enrolled in and passed ENGL 1301 at some time during the reporting period.

Cohort Cluster 3: MATH 0306 (Pre-Algebra only). Cohort cluster 3 includes all students enrolled in only MATH 0306, Pre-Algebra, in the initial term and followed through to the spring 1998 term. The sample size of cohort cluster 3, students enrolled in MATH 0306 only, was 2,324 (N=2,324). Table 7 includes all students enrolled and the final grades recorded for cohort cluster 3 members expressed in absolute numbers and relative percent.

Table 7 illustrates that of the 2,324 students enrolled in MATH 0306, 66.73 % (1,551) passed the course at some time during the reporting period. Therefore, MATH 0306 cohort cluster students demonstrate a success rate (pass with a "C" or better) of 66.73 percent.

Of the 1,551 students who passed MATH 0306, 1,241 (53.39%) enrolled in the next sequential MATH course (then called MATH 0308, Intermediate Algebra). Of the

1,241 students enrolled in MATH 0308, 23.62% or 549 students ever passed with a C or better. Twenty (20) of the cohort cluster 3 students (0.86%) enrolled in the next sequential course, MATH 0308, received a "D" or "F" for a final grade, while 342 (14.71%) received a "W", and 330 (14.19%) received an "I" or "IP" grade.

Table 7
Cohort Cluster 3: Students Enrolled in Pre-Algebra Only

MATH 0306			Subsequent Courses					
			MATH 0308		MATH 0310		MATH 1314	
Grade	N	Percent	N	Percent	N	Percent	N	Percent
Pass	1,551	66.73	549	23.62	217	9.33	117	5.03
D or F	46	1.97	20	0.86	5	0.21	28	1.20
W	575	24.74	342	14.71	105	4.51	47	2.02
I or IP	538	23.14	330	14.19	118	5.07	0	0.00
Total	2,710	116.60	1,241	53.39	445	19.14	192	8.26

Note: Some students may repeat the same course during the reporting period and therefore the total number of student enrollments may exceed the initial cohort cluster sample size (N = 2,324). Cohort sample size is "headcount" whereas "total" is enrollments.

Of all cohort cluster 3 students ever enrolled in MATH 0306 (N=2,324) over the reporting period, 117 (5.03 %) ever enrolled in and passed MATH 1314 at some time during the reporting period.

Research Question 2

What is the success rate of First-Time-In-College (FTIC) students enrolled in only ENGL 0305 (Developmental Reading II), or only ENGL 0307 (Developmental Writing II), or only MATH 0310 (Intermediate Algebra) between fall 1992 to spring 1998?

Cohort Cluster 4: ENGL 0305: (Developmental Reading II only). Cohort cluster 4 includes all students enrolled in only ENGL 0305, Developmental Reading II, in the initial term and followed through to the spring 1998 term. The sample size of cohort cluster 4, students enrolled in ENGL 0305 only, is 959 (N=959). Table 8 includes all

students enrolled and the final grades recorded for cohort cluster 4 members expressed in absolute numbers and relative percent

Table 8 illustrates that of the 959 students enrolled in ENGL 0305, 68.09 % (653) passed the course at some time during the reporting period.

Of the 653 students who passed ENGL 0305, 388 (40.45%) enrolled in the next sequential ENGL course (Composition and Rhetoric I). Of the 388 students enrolled in ENGL 1301, 24.40 % or 234 students ever passed with a C or better. Sixty-five (65) of the cohort cluster 4 students (6.77%) enrolled in the next sequential course, ENGL 1301 received a "D" or "F" for a final grade, while 88 (9.17%) received a "W", and 1 (0.01%) received an "I" or "IP" grade. It is uncommon to receive an "I" grade in the academic ENGL 1301course and grades of "IP" are non-existent in academic courses.

Table 8
Cohort Cluster 4: Students Enrolled in Developmental Reading II Only

	ENGL 0305		Subsequent Courses ENGL 1301	
Grade	N	Percent	N	Percent
Pass	653	68.09	234	24.40
D or F	28	2.91	65	6.77
W	229	23.87	88	9.17
I or IP	152	15.84	1	0.10
Total	1,062	110.74	388	40.45

Note: Some students may repeat the same course during the reporting period and therefore the total number of student enrollments may exceed the initial cohort cluster sample size (N = 959). Cohort sample size is "headcount" whereas "total" is enrollments.

Of all cohort cluster 4 students ever enrolled in ENGL 0305 (N=959), 234 out of 959 (24.40%) ever enrolled in and passed ENGL 1301 at some time during the reporting period.

Cohort Cluster 5: English 0307 (Developmental Writing II only). Cohort cluster 5 includes all students enrolled in only ENGL 0307, Developmental Writing II, in the initial term and followed through to the spring 1998 term. The sample size of cohort cluster 5, students enrolled in ENGL 0307 only, is 2,736 (N=2,736). Table 9 includes all students enrolled and the final grades recorded for cohort cluster 5 members expressed in absolute numbers and relative percent.

Table 9 illustrates that of the 2,736 students enrolled in ENGL 0307, 65.24 % (1,785) passed the course at some time during the reporting period.

Of the 1,785 students who passed ENGL 0307, 1,520 (55.55%) enrolled in the next sequential ENGL 1301 course (Composition and Rhetoric I). Of the 1,520 students enrolled in ENGL 1301, 30.04% or 822 students ever passed with a C or better. Two-hundred seventy-eight (278) of the cohort cluster 5 students (10.16%) enrolled in the next sequential course, ENGL 1301 received a "D" or "F" for a final grade, while 419 (15.31%) received a "W", and 1 (0.03%) received an "I" or "IP" grade. It is uncommon to receive an "I" grade in the academic ENGL 1301course and grades of "IP" are non-existent in academic courses.

Of all cohort cluster 5 students ever enrolled in ENGL 0307 (N=2,736), 822 out of 2,736 (30.04%) ever enrolled in and passed ENGL 1301at some time during the reporting period.

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Table 9
Cohort Cluster 5: Students Enrolled in Developmental Writing II Only

	ENGL 0307		Subsequent Courses	
			ENGL 1301	
Grade	N	Percent	N	Percent
Pass	1,785	65.24	822	30.04
D or F	82	2.99	278	10.16
W	741	27.08	419	15.31
I or IP	526	19.22	1	0.03
Total	3,134	114.54	1,520	55.55

Note: Some students may repeat the same course during the reporting period and therefore the total number of student enrollments may exceed the initial cohort cluster sample size (N = 2,736). Cohort sample size is "headcount" whereas "total" is enrollments.

Cohort Cluster 6: MATH 0310 (Intermediate Algebra II only). Cohort cluster 6 includes all students enrolled in only MATH 0310, Intermediate Algebra, in the initial term and followed through to the spring 1998 term. The sample size of cohort cluster 6, all students enrolled in MATH 0310 only, is =874.

Table 10 includes all students enrolled and the final grades recorded for cohort cluster 6 members expressed in absolute numbers and relative percent. Table 10 illustrates that of the 874 students enrolled in MATH 0310, 57.66 % (504) passed the course at some time during the reporting period. Therefore, MATH 0310 cohort cluster students demonstrate a success rate (pass with a "C" or better) of 57.66 percent.

Of the students who passed MATH 0310, 435 (49.77%) enrolled in the next sequential MATH 1314 course (College Algebra). Of the 435 students enrolled in MATH 1314, 27.00% or 236 students ever passed with a C or better at some time during the reporting period. Sixty-two (62) of the cohort cluster 6 students (7.09%) enrolled in the next sequential course, MATH 1314, received a "D" or "F" for a final grade, while 137 (15.67%) received a "W".

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Table 10
Cohort Cluster 6: Students Enrolled in Intermediate Algebra Only

	MATH 0310		Subsequent Courses	
			MATH 1314	
Grade	N	Percent	N	Percent
Pass	504	57.66	236	27.00
D or F	8	0.91	62	7.09
W	239	27.34	137	15.67
I or IP	267	30.54	0	0.00
Total	1,018	116.47	435	49.77

Note: Some students may repeat the same course during the reporting period and therefore the total number of student enrollments may exceed the initial cohort cluster sample size (N = 874). Cohort sample size is "headcount" whereas "total" is enrollments.

Of all cohort cluster 6 students ever enrolled in MATH 0310 (N=874), 236 (27.00%) ever enrolled in and passed MATH 1314 at some time during the reporting period.

Research Question 3

What is the success rate of First-Time-In-College (FTIC) students enrolled in MATH 0306 (Pre-Algebra) and ENGL 0306 (Developmental Writing I) between fall 1992 to spring 1998?

Cohort Cluster 7: ENGL 0306 and MATH 0306 (Developmental Writing I and Pre-Algebra). Cohort cluster 7 includes all students enrolled in both ENGL 0306 (Developmental Writing I) and MATH 0306 (Pre-Algebra) in the initial term and followed through to the spring 1998 term. The sample size of cohort cluster 7, all students enrolled in both ENGL 0306 and MATH 0306 only, is 478 (N=478). Table 11 includes all students enrolled in both courses and the final grades recorded for cohort cluster 7 members expressed in absolute numbers and relative percent.

Table 11 illustrates that of the 478 students enrolled both ENGL 0306 and MATH 0306, 58.57% % (280) passed the ENGL 0306 course at some time during the reporting

period. Of the 478 students enrolled in cohort cluster 7, 44.14 % (211) passed MATH 0306 with a "C" or better at some time during the reporting period.

Table 11

Cohort Cluster 7: Students Enrolled in Developmental Writing I and Pre-Algebra

ENGL 0306 and MATH 0306					Subsequent Courses									
	ENGL 0306		MATH 0306		ENGL 0307		ENGL 1301		MATH 0308		MATH 0310		MATH 1314	
Grade	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Pass	280	58.57	211	44.14	91	19.03	41	8.57	57	11.92	27	5.64	9	1.88
D or F	8	1.76	12	2.51	7	1.46	14	2.92	4	0.83	1	0.20	5	1.04
W	151	31.59	174	36.40	47	9.83	14	2.92	76	15.89	7	1.46	4	0.83
I or IP	92	19.24	182	38.07	58	12.13	0	0.00	84	17.57	20	4.18	0	0.00
Total	531	111.08	579	121.12	203	42.46	69	14.43	221	46.23	55	11.50	18	3.76

Note: Some students may repeat the same course during the reporting period and therefore the total number of student enrollments may exceed the initial cohort cluster sample size (N = 478). Cohort sample size is "headcount" whereas "total" is enrollments.

Of all cohort cluster 7 students ever enrolled in both ENGL 0306 and MATH 0306 (N=478) over the reporting period, 41 (8.57%) ever enrolled in and passed ENGL 1301 sometime during the reporting period. Of all cohort cluster 7 students ever enrolled in MATH 0306 (N=478) over the reporting period, 18 ever enrolled in MATH 1314. Of those eighteen students who ever enrolled in the first college-level math, MATH 1314, 9 (1.88 %) passed MATH 1314 with a "C" or better sometime during the reporting period.

Research Question 4

What is the success rate of First-Time-In-College (FTIC) students enrolled in ENGL 0304 (Developmental Reading I) and ENGL 0306 (Developmental Writing I) between fall 1992 to spring 1998? (Cohort Cluster 8)

Cohort Cluster 8 ENGL 0304 and ENGL 0306 ((Developmental Reading I and Developmental Writing I). Cohort cluster 8 includes all students enrolled in both ENGL 0304 (Developmental Reading I) and ENGL 0306 (Developmental Writing) in the initial term and followed through to the spring 1998 term. The sample size of cohort cluster 8, all students enrolled in both ENGL 0304 and ENGL 0306, is 243 (N=243). Table 12 is a summary of all students enrolled over the period of twelve semesters and the final grades recorded for these cohort cluster 8 members expressed in absolute numbers and relative percent.

Table 12 illustrates that of the 243 students enrolled in both ENGL 0304 and ENGL 0306, 63.37 % (154) passed ENGL 0304 course with a "C" or better sometime during the reporting period. For this same cohort cluster, 28/243 (11.52%) passed ENGL 0306 with a "C" or better sometime during the reporting period.

Table 12

Cohort Cluster 8: Students Enrolled in Developmental Reading I and Developmental Writing I

	ENGL 0304 and ENGL 0306				Subsequent Courses					
	ENGL 0304		ENGL 0306		ENGL 0305		ENGL 0307		ENGL 1301	
Grade	N	%	N	%	N	%	N	%	N	%
Pass	154	63.37	28	11.52	66	27.16	57	23.45	22	9.05
D or F	6	2.46	2	0.82	1	0.41	4	1.64	18	7.40
W	52	21.39	17	6.99	13	5.34	10	4.11	15	6.17
I or IP	50	20.57	20	8.23	26	10.69	36	14.81	0	0.00
Total	262	107.81	67	27.57	106	43.62	107	44.03	55	22.63

Note: Some students may repeat the same course during the reporting period and therefore the total number of student enrollments may exceed the initial cohort cluster sample size (N = 243). Cohort sample size is "headcount" whereas "total" is enrollments.

Of all cohort cluster 8 students ever enrolled in both ENGL 0304 (Developmental Reading I) and ENGL 0306 (Developmental Writing I) (N = 243), 22 (9.05 %) ever enrolled in and passed ENGL 1301 sometime during the reporting period.

Research Question 5

What is the success rate of First-Time-In-College (FTIC) students enrolled in ENGL 0304 (Developmental Reading I) and ENGL 0306 (Developmental Writing I) and MATH 0306 (Pre-Algebra) between fall 1992 to spring 1998?

Cohort Cluster 9 ENGL 0304 and ENGL 0306 and MATH 0306 (Developmental Reading I and Developmental Writing I and Pre-Algebra). Cohort cluster 9 includes all students enrolled in ENGL 0304 (Developmental Reading I), and ENGL 0306 (Developmental Writing I), and MATH 0306 (Pre-Algebra). The sample size of cohort cluster 9, all students enrolled in all three of the lowest level developmental reading, writing, and math courses, was 285 (N = 285). Table 13 includes all students enrolled and the final recorded grades for members of cohort cluster 9 expressed in absolute numbers and relative percent. Table 13 illustrates that of the 285 students enrolled in ENGL 0304, and ENGL 0306 and MATH 0306, 177 (62.10 %) passed ENGL 0304 sometime during the reporting period; 168 (58.94 %) passed ENGL 0306 sometime during the reporting period; and 123 (43.15 %) passed MATH 0306 sometime during the reporting period.

Of all cohort cluster 9 students ever enrolled in ENGL 0304 and ENGL 0306 and MATH 0306 (N = 285), 71 (24.91 %) ever enrolled in ENGL 1301. Of those 71 students 21 (2.9 %) ever passed ENGL 1301 sometime during the reporting period. Of all cohort cluster 9 students ever enrolled in MATH 0306 (N= 285), 11 (3.85 %) ever enrolled in MATH 1314. Of those 11 students from cohort cluster 9 (N = 285), three (1.05 %) passed MATH 1314 sometime during the reporting period, another 3 students (1.05 %)

received a final grade of "D or F" while 5 (1.75 %) received a final grade of "W" sometime during the reporting period.

Table 13

Cohort Cluster 9: Students Enrolled in Developmental Reading I and Developmental Writing I and Pre-Algebra

ENGL 0304 and ENGL 0306 and MATH 0306						
	ENGL 0304		ENGL 0306		MATH 0306	
Grade	N	%	N	%	N	%
Pass	177	62.10	168	58.94	123	43.15
D or F	6	2.10	6	2.10	10	3.50
W	69	24.21	77	27.01	115	40.35
I or IP	72	25.26	72	25.26	149	52.28
Total	324	113.68	323	113.33	397	139.29

Subsequent Courses												
Grade	ENGL 0305		ENGL 0307		ENGL 1301		MATH 0308		MATH 0310		MATH 1314	
	N	%	N	%	N	%	N	%	N	%	N	%
Pass	77	27.01	72	25.26	21	7.36	45	15.78	11	3.85	3	1.05
D or F	3	1.05	4	1.40	15	5.26	0	0.00	0	0.00	3	1.05
W	25	8.77	34	11.92	35	12.28	40	14.03	15	5.26	5	1.75
I or IP	36	12.63	43	15.08	0	0.00	63	22.10	26	9.12	0	0.00
Total	141	49.47	153	53.68	71	24.91	148	51.92	52	18.24	11	3.85

Note: Some students may repeat the same course during the reporting period and therefore the total number of student enrollments may exceed the initial cohort cluster sample size (N = 285). Cohort sample size is "headcount" whereas "total" is enrollments.

Research Question 6

What is the success rate of First-Time-In-College (FTIC) students enrolled in MATH 0310 (Intermediate Algebra) and ENGL 0307 (Developmental Writing II) between fall 1992 to spring 1998? (cohort cluster 10)

Cohort Cluster 10: ENGL 0307 and MATH 0310 (Developmental Writing II and Intermediate Algebra). Cohort cluster 10 includes all students enrolled in both ENGL 0307 and MATH 0310 in the initial term and followed through to the spring 1998 term. The sample size of cohort cluster 10 was 412 (N = 412). Table 14 is a summary of all students enrolled in both ENGL 0307 and MATH 0310 over the period of twelve semesters and the final recorded grades for these cohort cluster members are reported in both absolute numbers and relative percent.

Table 14 illustrates that of the 412 cohort cluster 10 members enrolled in both ENGL 0307 and MATH 0310, 274 (66.50 %) passed ENGL 0307 at sometime during the reporting period. While 253 (61.40 %) enrolled in both ENGL 0307 and MATH 0310, 125 (30.33 %) passed MATH 0310 at sometime during the reporting period.

Table 14
Cohort Cluster 10: Students Enrolled in Developmental Writing II and Intermediate Algebra

	ENGL 0307 and MATH 0310				Subsequent Courses			
	ENGL 0307		MATH 0310		ENGL 1301		MATH 1314	
Grade	N	%	N	%	N	%	N	%
Pass	274	66.50	253	61.40	168	40.77	125	30.33
D or F	11	2.66	3	0.72	44	10.67	51	12.37
W	101	24.51	125	30.33	64	15.53	63	15.29
I or IP	71	17.23	128	31.06	0	0.00	1	0.24
Total	457	110.92	509	123.54	276	66.99	240	58.25

Note: Some students may repeat the same course during the reporting period and therefore the total number of student enrollments may exceed the initial cohort cluster sample size (N= 412). Cohort sample size is "headcount" whereas "total" is enrollments.

Of all cohort cluster 10 students enrolled in both ENGL 0307 and MATH 0310 (N=412), 276 (66.99 %) ever enrolled in ENGL 1301. Of these 276 students enrolled in

ENGL 1301, 168 (40.77 %) ever passed ENGL 1301 at some time during the reporting period. Of the 412 cohort cluster members, 240 (58.25 %) ever enrolled in MATH 1314 and 125 (30.33 %) ever passed MATH 1314 at some time during the reporting period.

Research Question 7

What is the success rate of First-Time-In-College (FTIC) students enrolled in ENGL 0305 (Developmental Reading II) and ENGL 0307 (Developmental Writing II) between fall 1992 to spring 1998? (cohort cluster 11)

Cohort Cluster 11: ENGL 0305 and ENGL 0307 (Developmental Reading II and Developmental Writing II). Cohort cluster 11 includes all students enrolled in only ENGL 0305 and ENGL 0307 in the initial term and followed through to the spring 1998 term. The sample size of cohort cluster 11, students enrolled in ENGL 0305 and ENGL 0307 only, was 1,329 (N = 1,329). Table 15 includes all students enrolled and the final grades recorded for cohort cluster 11 members expressed in absolute numbers and relative percent. Table 15 illustrates that of the 1,329 students enrolled in ENGL 0305, 933 (70.20 %) passed ENGL 0305 at some time during the reporting period. Additionally, 885 students (66.59 %) of cohort cluster 11 passed ENGL 0307 at some time over the reporting period.

Seventeen (17) of the 1329 students ever enrolled in ENGL 0305 received a "D" or "F" for a final grade (1.27 %) while 273 (20.54 %) received a "W", and 249 (18.73 %) received an "I" or "IP" grade.

Of all cohort cluster 11 students enrolled in both ENGL 0305 and ENGL 0307 (N= 1,329), 866 (65.16 %) ever enrolled in ENGL 1301. Of these 866 students enrolled in ENGL 1301, 434 (32.65 %) ever passed ENGL 1301 at some time during the reporting period.

Table 15
Cohort Cluster 11: Students Enrolled in Developmental Reading II and Developmental Writing II

	ENGL 0305 and ENGL 0307				Subsequent Courses	
	ENGL 0305		ENGL 0307		ENGL 1301	
Grade	*N*	%	*N*	%	*N*	%
Pass	933	70.20	885	66.59	434	32.65
D or F	17	1.27	30	2.25	173	13.01
W	273	20.54	286	21.51	258	19.41
I or IP	249	18.73	321	24.15	1	0.07
Total	1,472	110.76	1,522	114.52	866	65.16

Note: Some students may repeat the same course during the reporting period and therefore the total number of student enrollments may exceed the initial cohort cluster sample size (N = 1,329). Cohort sample size is "headcount" whereas "total" is enrollments.

Research Question 8

What is the success rate of First-Time-In-College (FTIC) students enrolled in ENGL 0305 (Developmental Reading II) and ENGL 0307 (Developmental Writing II) and MATH 0310 (Intermediate Algebra) between fall 1992 to spring 1998?

Cohort Cluster 12 ENGL 0305 and ENGL 0307 and MATH 0310 (Developmental Reading II and Developmental Writing II and Intermediate Algebra). Cohort cluster 12 includes all students enrolled in ENGL 0305 and ENGL 0307 and MATH 0310 in the initial term and followed through to the spring 1998 term. The sample size of cohort cluster 12 was 177. Table 16 includes all students enrolled and the final grades recorded for cohort cluster 11 members expressed in absolute numbers and relative percent. Table 15 illustrates that of the 177 students enrolled in ENGL 0305, 127 (71.75 %) passed ENGL 0305 at some time during the reporting period. Additionally, 126 students (71.18 %) of cohort cluster 11 passed ENGL 0307 at some time over the reporting period and

121 (68.36 %) of cohort cluster 11 passed MATH 0310 at some time during the reporting period.

One (1) of the 177 students ever enrolled in ENGL 0305 received a "D" or "F" for a final grade (0.56 %) while 40 (22.59 %) received a "W", and 27 (15.25 %) received an "I" or "IP" grade. Similarly, of the 177 students of cohort cluster 11, 126 (71.18 %) passed ENGL 0307 at some time during the reporting period while 3 (1.69 %) received a "D" or "F", 39 (22.03 %) received a "W", and 30 (16.94 %) received a "I" or "IP" at sometime during the reporting period.

Table 16

Cohort Cluster 12: Students Enrolled in Developmental Reading II and Developmental Writing II and Intermediate Algebra

ENGL 0305 and ENGL 0307 and MATH 0310							Subsequent Courses			
	ENGL 0304		ENGL 0306		MATH 0310		ENGL 1301		MATH 1314	
Grade	N	%	N	%	N	%	N	%	N	%
Pass	127	71.75	126	71.18	121	68.36	82	46.32	68	38.41
D or F	1	0.56	3	1.69	2	1.12	24	13.55	32	18.07
W	40	22.59	39	22.03	46	25.98	43	24.29	43	24.29
I or IP	27	15.25	30	16.94	64	36.15	0	0.00	0	0.00
Total	195	110.16	198	111.86	233	131.63	149	84.18	143	80.79

Note: Some students may repeat the same course during the reporting period and therefore the total number of student enrollments may exceed the initial cohort cluster sample size (N = 177). Cohort sample size is "headcount" whereas "total" is enrollments.

Of the 177 cohort cluster 12 students, 149 (84.18 %) ever enrolled in ENGL 1301 and of those enrolled in ENGL 1301, 82 (46.32 %) ever passed at some time during the reporting period. Of the 177 cohort cluster 12 students, 143 (80.79 %) ever enrolled in the first college-level mathematics course (MATH 1314) and 68 (38.41 %) ever passed

the course with a "C" or better at some time during the reporting period. Of those enrolled in MATH 1314, 32 (18.07 %) received a "D" or "F" and 43 (24.29 %) received a "W" at some time during the reporting period.

Research Question 9

What are the persistence rates of First-Time-In-College (FTIC) for all cohort clusters 1-12 between fall 1992 and spring 1998?

Persistence is defined as the successful completion of a developmental studies course accompanied by enrollment in Composition and Rhetoric I (ENGL 1301) and/or College Algebra (MATH 1314). Composition and Rhetoric I is the first college-level reading and writing intensive course whereas College Algebra is considered the first college-level mathematics course. Simple enrollment in an appropriate academic course after successful completion of a developmental studies course does not imply academic success.

Research Question 10

What is the success rate of students who enroll in ENGL 1301 (Composition and Rhetoric I) after successfully completing a developmental ENGL course or sequence as compared to its control group of students?

Cohort Cluster 13: ENGL 1301 (Composition and Rhetoric I). Cohort cluster 13 includes all students enrolled in ENGL 1301 who were not required to enroll in any developmental English courses based on the results of individual reading and writing scores on the ASSET placement test or SAT scores. The sample size of cohort cluster 13 was 7,925. Table 18 illustrates that of the 7,925 students enrolled in ENGL 1301, 5,853 (73.85 %) passed the course at some time during the reporting period. Additionally, 1,383 (17.45 %) received a final grade of "D" or "F", 1,902 (24.00 %) received a "W", and 5 (0.06 %) received a "I" at some time during the reporting period.

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Table 17
Persistence Rate vs. Cohort Cluster

Cohort Cluster Number	Courses	Course Title	Persistence Rate	
			Percent enrolled of cohort cluster	Number enrolled / number in cohort cluster
1	ENGL 0304	Developmental Reading I	15.26	38/249
2	ENGL 0306	Developmental Writing I	21.03	106/504
3	MATH 0306	Pre-Algebra	8.26	192/2,324
4	ENGL 0305	Developmental Reading II	40.45	388/959
5	ENGL 0307	Developmental Writing II	55.55	1,520/2,736
6	MATH 0310	Intermediate Algebra	49.77	435/974
7	ENGL 0306	Developmental Writing I	14.43	69/478
	and	and		
	MATH 0306	Pre-Algebra	3.76	18/478
8	ENGL 0304	Developmental Reading I	22.63	55/243
	and	and		
	ENGL 0306	Developmental Writing I		

(table continues)

Cohort Cluster Number	Courses	Course Title	Persistence Rate	
			Percent enrolled of cohort cluster	Number enrolled / number in cohort cluster
9	ENGL 0304	Developmental Reading I	24.91	71/285
	and	and		
	ENGL 0306	Developmental Writing I		
	and	and		
	MATH 0306	Pre-Algebra	3.85	11/285
10	ENGL 0307	Developmental Writing II	66.99	276/412
	and	and		
	MATH 0310	Intermediate Algebra	58.25	240/412
11	ENGL 0305	Developmental Reading II	65.16	866/1,329
	and	and		
	ENGL 0307	Developmental Writing II		
12	ENGL 0305	Developmental Reading II	84.18	149/177
	and	and		
	ENGL 0307	Developmental Writing II		
	and	and		
	MATH 0310	Intermediate Algebra	80.79	143/177
13	ENGL 1301	Composition and Rhetoric I	115.36	9,143/7,925
14	MATH 1314	College Algebra	115.84	1,806/1,559

Note: Some students may repeat the same course during the reporting period and therefore the total number of student enrollments may exceed the initial cohort cluster sample size (N). Cohort sample size is "headcount" whereas "total" is enrollments.

Table 18
Cohort Cluster 13: Students Enrolled in Composition and Rhetoric I

ENGL 1301		
Grade	N	Percent
Pass	5,853	73.85
D or F	1,383	17.45
W	1,902	24.00
I or IP	5	0.06
Total	9,143	115.36

Note: Some students may repeat the same course during the reporting period and therefore the total number of student enrollments may exceed the initial cohort cluster sample size (N = 7,925). Cohort sample size is "headcount" whereas "total" is enrollments

Research Question 11

What is the success rate of students who enroll in MATH 1314 (College Algebra) after successfully completing a developmental MATH course or sequence as compared to its control group of students?

Cohort Cluster 14: MATH 1314 (College Algebra). Cohort cluster 14 includes all students enrolled in MATH 1314 who were not required to enroll in any developmental mathematics courses based on the results of individual math scores on the ASSET placement test or SAT scores. The sample size of cohort cluster 14 was 1,559. Table 19 illustrates that of the 1,559 students enrolled in MATH 1314, 968 (62.09 %) passed the course at some time during the reporting period. Additionally, 296 (18.98 %) received a final grade of "D" or "F" and 542 (34.76 %) received a "W" at some time during the reporting period. No "I" grades were issued.

Table 19
Cohort Cluster 14: Students Enrolled in College Algebra

MATH 1314		
Grade	N	Percent
Pass	968	62.09
D or F	296	18.98
W	542	34.76
I or IP	0	0.00
Total	1,806	115.84

Note: Some students may repeat the same course during the reporting period and therefore the total number of student enrollments may exceed the initial cohort cluster sample size (N = 1,559). Cohort sample size is "headcount" whereas "total" is enrollments.

Table 20 presents the academic success rates by cohort cluster in absolute numbers and relative percent. The academic success rate is defined as completion of the first appropriate college-level academic course with an earned final grade of "C" or better.

Table 21 presents both persistence rates and academic success rates for all cohort clusters. These data present a conspicuous disparity between both academic success rates and persistence rates for the *absolutely underprepared* student and the *relatively underprepared* student. For the purposes of this study, *absolutely underprepared* students are those students who are enrolled in one or more of the lower-level developmental studies courses (Boylan, H. R., and Saxon, P. D., 1997). *Absolutely underprepared* students are those whose basic skill levels in reading, writing, and/or mathematics are well below the minimal performance levels required for placement in academic courses of English and/or mathematics. The *absolutely underprepared* students in this study are members of cohort cluster Numbers 1, 2, 3, 7, 8, and 9. The *absolutely*

underprepared cohort cluster Numbers are indicated by an asterisk (*) adjacent to the Cohort Cluster Number in Table 21.

Table 20
Academic Success Rates vs. Cohort Cluster

Cohort Cluster Number	Courses	Course Title	Academic Success Rate (# Passed academic course/ cohort cluster N)	
			Number passed / N	Percent
1	ENGL 0304	Developmental Reading I	16 of 249	6.42%
2	ENGL 0306	Developmental Writing I	55 of 504	10.91 %
3	MATH 0306	Pre-Algebra	117 of 2324	5.03 %
4	ENGL 0305	Developmental Reading II	234 of 959	24.44 %
5	ENGL 0307	Developmental Writing II	822 of 2736	30.04 %
6	MATH 0310	Intermediate Algebra	236 of 874	27.00 %
7	ENGL 0306	Developmental Writing I	41 of 478	8.56 %
	and			
	MATH 0306	Pre-Algebra	9 of 478	1.88 %
8	ENGL 0304	Developmental Reading I	22 of 243	9.05 %
	and	and		
	ENGL 0306	Developmental Writing I		
9	ENGL 0304	Developmental Reading I	21 of 285	7.36 %
	and	and		
	ENGL 0306	Developmental Writing I		
	and	and		
	MATH 0306	Pre-Algebra	3 of 285	1.05 %

(table continues)

Cohort Cluster Number	Courses	Course Title	Academic Success Rate (# Passed academic course/ cohort cluster N)	
			Number passed / N	Percent
10	ENGL 0307	Developmental Writing II	168 of 412	40.77 %
	and	and		
	MATH 0310	Intermediate Algebra	125 of 412	30.33 %
11	ENGL 0305	Developmental Reading II	434 of 1,329	32.65 %
	and	and		
	ENGL 0307	Developmental Writing II		
12	ENGL 0305	Developmental Reading II	82 of 177	46.32 %
	and			
	ENGL 0307	Developmental Writing II		
	and			
	MATH 0310	Intermediate Algebra	68 of 177	38.41 %
13	ENGL 1301	Composition and Rhetoric I	5,853 of 7,925	73.85 %
14	MATH 1314	College Algebra	968 of 1,559	62.09 %

Note: Some students may repeat the same course during the reporting period and therefore the total number of student enrollments may exceed the initial cohort cluster sample size (N). Cohort sample size is "headcount" whereas "total" is enrollments

Relatively underprepared students are students enrolled in one or more developmental studies courses at or near the highest level (Boylan, H. R., and Saxon, P. D., 1997). *Relatively underprepared* students are those who basic skills are just below the minimal performance levels required for direct placement into college-level academic courses of English and/or mathematics. Hence, the *relatively underprepared* student may need less basic skill development than the *absolutely underprepared* student.

These data identify the academic success rate for all English 1301 students who did not place directly into developmental reading or developmental writing to be 73.85%

(5,853/7,925). The academic success rate for first-time in college students placed directly into college-level mathematics, MATH 1314, is 62.09% (968/1,559).

Clearly, this research supports that of Hunter Boylan who distinguished between the ***absolutely underprepared*** student and the *relatively underprepared* student. The more underprepared for college-level performance, the less likely the student will ever enroll (persist) in a single academic course or if enrolled, pass the academic course. Conversely, developmental studies students who are enrolled in the higher level developmental courses, or in a single higher level developmental course, are far more likely to enroll in (persist) and achieve academic success in college-level courses.

Table 21
Persistence and Academic Success Rates for all Cohort Clusters

Cohort Cluster Number	Cohort Composition	Persistence Rate		Academic Success Rate	
		Percent enrolled of cohort cluster	Number enrolled / N	Percent	Number enrolled/N
1 *	Developmental Reading I	15.26%	38/249	6.42%	16 of 249
2 *	Developmental Writing I	21.03%	106/504	10.91%	55/504
3 *	Pre-Algebra	8.26%	192/2,324	5.03%	117/2,324
4	Developmental Reading II	40.45%	388/959	24.44%	234/959
5	Developmental Writing II	55.55%	1,520/2,736	30.04%	822/2,736
6	Intermediate Algebra	49.77%	435/974	27.00%	236/874
7 *	Developmental Writing I	14.43%	69/478	8.56%	41/478
	and				
	Pre-Algebra	3.76%	18/478	1.88%	9/478

(table continues)

Cohort Cluster Number	Cohort Composition	Persistence Rate		Academic Success Rate	
		Percent enrolled of cohort cluster	Number enrolled / N	Percent	Number enrolled/N
8 *	Developmental Reading I and Developmental Writing I	22.63	55/243	9.05%	22/243
9 *	Developmental Reading I and Developmental Writing I	24.91	71/285	7.36%	21/285
	and Pre-Algebra	3.85	11/285	1.05%	3/285
10	Developmental Writing II	66.99	276/412	40.77%	168/412
	and Intermediate Algebra	58.25	240/412	30.33%	125/412
11	Developmental Reading II and Developmental Writing II	65.16	866/1,329	32.65%	434/1,329
12	Developmental Reading II and Developmental Writing II	84.18	149/177	46.32%	82/177
	and Intermediate Algebra	80.79	143/177	38.41%	68/177
13	Composition and Rhetoric I	115.36%	9,143/7,925	73.85%	5,853/7,925
14	College Algebra	115.84%	1,806/1,559	62.09%	968/1,559

Note: Some students may repeat the same course during the reporting period and therefore the total number of student enrollments may exceed the initial cohort cluster sample size (N). Cohort sample size is "headcount" whereas "total" is enrollments.

For the purpose of data interpretation and clarity, Tables 22, 23 and 24 present the academic success rates organized by *absolutely underprepared* and *relatively underprepared* and *control* cohort clusters, respectively.

Table 22
Absolutely Underprepared vs. Academic Success Rates

Absolutely Underprepared Cohort Cluster Number	Cohort Composition	Academic Success Rate	
		Percent	Number enrolled/N
1 *	Developmental Reading I	6.42%	16 /249
2 *	Developmental Writing I	10.91%	55/504
3 *	Pre-Algebra	5.03%	117/2,324
7 *	Developmental Writing I	8.56%	41/478
	and		
	Pre-Algebra	1.88%	9/478
8 *	Developmental Reading I	9.05%	22/243
	and		
	Developmental Writing I		
9 *	Developmental Reading I	7.36%	21/285
	and		
	Developmental Writing I		
	and		
	Pre-Algebra	1.05%	3/285

Note: Some students may repeat the same course during the reporting period and therefore the total number of student enrollments may exceed the initial cohort cluster sample size (N). Cohort sample size is "headcount" whereas "total" is enrollments

The range of academic success across all *absolutely underprepared* cohort clusters is from a low of 1.88% in Pre-Algebra (Cohort Cluster 7) to a high of 10.91% in Developmental Writing I (Cohort Cluster 2). *Absolutely underprepared* students in cohort cluster 9, enrolled in all three lowest level developmental studies courses, demonstrate an academic success with respect to Pre-Algebra of 1.05% (3/285). The range of academic success across all *relatively underprepared* cohort clusters is from a low of 24.44% in Developmental Reading II (Cohort Cluster 4) to a high of 46.32% in

Developmental Reading I and Developmental Writing I and Intermediate Algebra (Cohort Cluster 12).

In contrast, the academic success rate range experienced by the *absolutely underprepared* is between 1.88% - 10.91%.

Table 23
Relatively Underprepared vs. Academic Success Rates

Relatively Underprepared Cohort Cluster Number	Cohort Composition	Academic Success Rate	
		Percent	Number enrolled/N
4	Developmental Reading II	24.44%	234/959
5	Developmental Writing II	30.04%	822/2,736
6	Intermediate Algebra	27.00%	236/874
10	Developmental Writing II	40.77%	168/412
	and		
	Intermediate Algebra	30.33%	125/412
11	Developmental Reading II	32.65%	434/1,329
	and		
	Developmental Writing II		
12	Developmental Reading II	46.32%	82/177
	and		
	Developmental Writing II		
	and		
	Intermediate Algebra	38.41%	68/177
13	Composition and Rhetoric I	73.85%	5,853/7,925
14	College Algebra	62.09%	968/1,559

The control cohort clusters presented an academic success rate nearly twice as high than the academic success rates experienced by the *relatively underprepared* and much higher than the academic success rates demonstrated by the *absolutely underprepared* cohort clusters over the entire reporting period.

Table 24
Academic Success Ranges vs. Cohort Cluster Classification

Cohort Cluster Classification	Academic Success Range in Percent
Absolutely Underprepared	1.88 –10.91%
Relatively Underprepared	24.44 – 46.32 %
Control Cohort Cluster	
English 1301	73.85%
Math 1314	62.09 %

Summary

Absolutely underprepared students demonstrated an academic success rate many times lower than students classified as *relatively underprepared.* The academic success rates in percent for the *absolutely underprepared* cohorts was between 1.88 % to 10.91%. This indicates that between 2 to 10 *absolutely underprepared* students out of every 100 successfully completed their first college-level course over the entire reporting period.

The academic success rates of the *relatively underprepared* cohorts was between 24.44 – 46.32 %. This indicates that between 24 to 46 *relatively underprepared* students out of every 100 successfully completed their first college-level course over the entire reporting period.

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In contrast, the academic success rate of first-time in college students, determined to be college-ready by virtue of standardized assessment examination placement, was identified as 73.85% for college-level English and 62.09 % for college-level mathematics. The academic success rates for the *relatively underprepared* cohorts, although 2-4 times higher compared to the academic success rates for the absolutely underprepared cohorts, was still 2-3 times lower compared to the control cohort students that did not require developmental studies courses.

Persistence rates for the *absolutely underprepared* cohort were between 3.76 % - 24.91 %. Therefore, for every 100 *absolutely underprepared* students, between 4 to 25 of these students ever persist to *enroll* in a college-level academic course. In contrast, the relatively underprepared cohorts demonstrated a persistence rate between 40.45 % to 84.78 %. Therefore, for every 100 *relatively underprepared* students, between 40 to 84 of these students persist to *enroll* in a college-level academic course.

CHAPTER FIVE

Discussion and Recommendations

Introduction

Chapter One presented an introduction to this research study and the increasing need for developmental education programs and courses to serve the underprepared student who is not able to perform at the collegiate-level. Chapter Two presented a review of the relevant literature related to developmental studies courses and programs in higher education and the underprepared student. Additionally, Chapter Two included recent trends and attitudes toward developmental education, recent legislation regarding developmental education, and the distinction made between remedial education and developmental education. Also discussed were early historical perspectives, post World War II and its impact on the need for developmental education, the influence of federal legislation, a description of the current underprepared student population, enrollment and funding for Texas developmental education, the role of community colleges as providers of developmental education, and a systems approach to developmental education. Chapter Three presented the methods employed for this research. Chapter Four presented the research data and their interpretations. In this chapter, these data are discussed along with recommendations for future studies.

The purpose of this research was to determine if the developmental studies courses offered at North Harris Montgomery Community College District (NHMCCD), a large community college district, adequately prepare the underprepared student for academic success in college-level English and mathematics courses.

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Axiomatic to this research was the definition of academic success defined as the completion of a first college-level course in English Composition and Rhetoric I and/or College Algebra with a final grade of "C" or better. English Composition and Rhetoric I was selected since this academic course is designated by the Texas Higher Education Coordinating Board (THECB) as the first college-level reading and writing intensive course in the state of Texas. Similarly, College Algebra (MATH 1314) was selected since this academic course is designated by the Texas Higher Education Coordinating Board as the first college-level mathematics course. According to the Texas Higher Education Coordinating Board, the purpose of developmental education is to provide students with the skills required to achieve academic success in collegiate-level courses. Chapter 5, subchapter P, Testing and Remediation of the THECB Guidelines define developmental education as follows:

> Developmental Education for the purposes of this subchapter is defined as courses, tutorials, laboratories, or other efforts to bring student skill levels in reading, writing, and mathematics to entering college level (THECB Guidelines, Chapter 5, subchapter P, 1999).

Therefore, an appropriate measure of academic preparedness is academic success in college-level courses after the completion of a developmental studies course or sequence of courses.

This research was also designed to determine the persistence rate of developmental studies students enrolled. Persistence rate was defined as the successful completion of a developmental studies course, or sequence of courses, accompanied by enrollment in Composition and Rhetoric I and/or College Algebra. Specific developmental studies courses were selected in cohort clusters to assess academic preparedness across all levels and selected permutations.

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All first-time college students enrolled in one or more developmental studies courses by cohort year, beginning in fall 1992 through spring 1998 terms, were followed by social security number to determine academic success rates and persistence rates by cohort clusters. All first-time in college students were assessed for reading, writing and mathematics skill-levels. Students whose individual assessment scores indicated the need for developmental studies were placed into the appropriate level developmental studies courses in reading, writing, and/or mathematics. Students whose assessment scores indicated college-readiness in reading, writing and/or mathematics were permitted to enroll in the first college-level courses in English 1301 and/or Mathematics 1314.

Therefore, students demonstrating academic readiness, and who enrolled into Composition and Rhetoric I (ENGL 1301) and/or College Algebra (MATH 1314), served as a control group. A comparison of academic success rates between developmental studies students who successfully complete a developmental course, or sequence of courses, and college-prepared students enrolled and completing the first level English and or math courses was conducted.

Summary

This study was undertaken to determine if the developmental studies courses at NHMCCD adequately prepare developmental studies students for academic success in college-level courses. The study was also designed to identify the persistence rate for developmental studies students throughout the reporting period for students enrolled in developmental studies courses at NHMCCD.

- *Absolutely underprepared* students demonstrated an academic success rate many times lower than students classified as *relatively underprepared.* The academic success rates for the *absolutely underprepared* cohorts were between 1.88 % to 10.91%. This indicates that between 2 to 10 *absolutely underprepared* students out

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of every 100 *absolutely underprepared* students successfully completed their first college-level course over the entire reporting period.

- The academic success rates of the *relatively underprepared* cohorts were between 24.44 – 46.32 %. This indicates that between 24 to 46 *relatively underprepared* students out of every 100 *relatively underprepared* students successfully completed their first college-level course over the entire reporting period.

- The academic success rate of first-time in college students, determined to be college-ready by virtue of standardized assessment examination placement, was identified as 73.85% for college-level English and 62.09 % for college-level mathematics.

- The academic success rates for the *relatively underprepared* cohorts, although 2-4 times higher compared to the academic success rates for the *absolutely underprepared* cohorts, were still 2 to 3 times lower compared to the control cohort students that did not require developmental studies courses.

- Persistence rates for the *absolutely underprepared* cohort were between 3.76 % to 24.91 %. Therefore, for every 100 *absolutely underprepared* students, between 4 to 25 *absolutely underprepared* students ever persisted to enroll in a college-level academic course. In contrast, the relatively underprepared cohorts demonstrated a persistence rate between 40.45 % to 84.78 %. Therefore, for every 100 *relatively underprepared* students, between 40 to 84 *relatively underprepared* students persisted to enroll in a college-level academic course.

Clearly, this research supports that of Hunter Boylan who distinguished between the *absolutely underprepared* student and the *relatively underprepared* student (Boylan, 1995). For the purposes of this study, the *absolutely underprepared* student is enrolled in one or more developmental studies courses at or near the lowest level. The *relatively underprepared* student is enrolled in one or more developmental studies courses at or near the highest level. The more underprepared for college-level performance, the less likely the student will ever enroll (persist) in a single academic course, much less successfully complete the course. Conversely, a developmental studies student who is enrolled in one or more higher-level developmental courses is far more likely to enroll in (persist) and achieve academic success in college-level courses.

However, the academic success rate experienced by the *absolutely underprepared* student is very much lower than the academic success rate experienced by the *relatively underprepared* student. The academic success rate experienced by the *relatively underprepared* student is much lower than the academic success rate experienced by the student who does not require developmental education courses. In addition, the *absolutely underprepared* student has a much lower persistence rate than the *relatively underprepared* student

Conclusions

The academic success rates for *absolutely underprepared* students are between 1.88 –10.91%. This is a very dismal academic success rate, implying that between 2 – 10 % of all *absolutely underprepared* students ever enroll in and complete a college-level academic course in English and/or mathematics. In light of these findings, NHMCCD must begin to ask why the academic success rates are so low and begin to initiate change that will increase these success rates for the *absolutely underprepared* students.

Students fail to achieve academic success for many reasons other than innate ability. Boylan has identified program components that are considered to be associated with student success in a 1997 article titled *Program Components and Their Relationship to Student Performance* published in the *Journal of Developmental Education*. Students fail to do well in college for a variety of reasons, and lack of basic skills is one of these reasons. Additional obstacles to academic success may include lack of adequate transportation, lack of child care, failure of the developmental studies program to provide student services that increase success rates, freedom from racism and genderism, deficient social and interpersonal skills, program structure and continuity, availability of

adequate tutorial services, availability of tutor training, availability of academic advising and counseling services, presence of program evaluation, financial concerns, and presence of a centralized program. A centralized program in which all courses are provided under a single administrative unit with its own director and coordinator is more effective in assuring academic success and persistence of developmental studies students (Roueche & Baker, 1986; Roueche and Snow, 1977; Boylan, Bliss & Bonham, 1997). Developmental studies students require a program structure that provides the necessary fail-safes. An array of support services must be provided for all developmental studies students including early intervention, financial assistance, child care services, availability of public transportation to the college, establishing peer and mentor groups, integration of literacy activities in all developmental studies courses, contextual learning, and a systems approach to program design.

One of the more common reasons that *absolutely underprepared* students fail to achieve academic success at rates comparable to college-ready students is that they are often faced with more immediate difficulties than college-prepared students. A*bsolutely underprepared* students are often faced with as many as nine or more developmental courses to complete before they obtain the basic reading, writing, and mathematics skills required for academic success in college-level courses. Completion of this number of sequential courses requires a minimum of three semesters. The *absolutely underprepared* students must complete these courses, pay for tuition, books, fees, and secure transportation to the college. During the semester, she must also juggle for time to study, complete assignments, arrange for appropriate childcare, prepare meals, while dealing with the stresses of holding down a forty-hour per week job. Many of the *absolutely underprepared* may be intermittently employed, on the marginal edge of employability.

Bonnie Longnion, Associate Vice Chancellor for Curriculum and Instruction at NHMCCD supports these views and states:

> The data and conclusions reported in this study reinforce the concept that the absolutely underprepared learner requires institutional leaders to develop and implement comprehensive services, support, and relevant courses and programs that provide a highly structured, coordinated systems approach for the learner. The low success rate for the learners can be explained by many factors -- competing goals such as family and work, conditioned "negative" attitudes regarding schooling or learning, low self esteem, personal challenges -- lack of transportation, funds, child care, and family support. Isolated instruction through the delivery of a couple of courses will unlikely combat all of the complex issues and challenges that face the absolutely underprepared learner. It will take the institution's best ideas, efforts, and resources to provide the necessary learning environment, support services, and effective instruction for the learner. The learner will often need a tremendous amount of support services such as financial assistance, transportation, childcare, advisors, mentors, counselors, and other referred and available social services in the community. The learner also requires a nurturing, but a highly structured instructional program that includes on-going assessment and monitoring; educational, personal and career goals; rewards for small increments of progress; high expectations of staff and faculty; tutoring; and a learning community that provides social, emotional, and academic support for the learner. The instructors need to be well prepared to meet the diverse needs of the learner, and the curricula need to be relevant and attainable (Longnion, 2000, e-mail correspondence).

Recommendations

- Eliminate the grade of "IP" (In-Progress). Developmental studies students must be encouraged to meet course requirements and not procrastinate meeting course exit requirements.
- Design all developmental studies courses as competency-based courses without the time constraints of semester completion dates.
- Develop a systems-approach for developmental studies programs.
- Establish a Developmental Studies Unit with a Director and Coordinator for developmental studies that report to an academic administrator.
- Develop stated goals and evaluate these goals continuously based on established protocols.
- Provide written statements of program goals and course objectives for all developmental student services and courses.

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- Establish regular meetings for all developmental studies faculty and staff to review progress towards stated goals and identify students in need of early intervention.
- Ensure that all developmental studies courses and services are connected and coordinated.
- Require an annual report on the effectiveness of developmental education based on expected annual stated goals and objectives. This report should be submitted through the department to the chief academic officer of the college.
- Identify exemplary developmental studies programs and emulate them.
- Encourage and support developmental studies faculty to obtain national certification through the National Association of Developmental Educators (NADE) or its state chapter.
- Encourage and support continued professional development for developmental studies instructors.
- Adopt an attitude of zero-tolerance for failure and establish all reasonable support services for developmental studies students.
- Establish an "open laboratory" where all developmental studies students can receive assistance, tutoring, and counseling services from morning to college closing time.
- Provide individual and group tutoring services on both informal and appointment bases.
- Model educational values that encourage academic success and achievement.
- Eliminate the ability for developmental studies students to enroll in college-level academic courses that require basic skills in reading and writing.
- Establish cohorts of developmental studies students whenever possible.
- Provide student mentors that are available for developmental studies students and assign a student mentor to all first year developmental studies students.
- Establish comprehensive early intervention strategies both in and out of the classroom.
- Provide multiple and alternative scheduling options for developmental studies classes.

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- Establish effective orientation and follow-up sessions for all developmental studies students that assist the student in acclimation to the college environment and mastery of self-management skills.

- Reduce the number of adjunct faculty delivering developmental studies courses.

Recommendations for Further Research

Little research has been conducted to determine how well developmental studies programs are meeting the needs of learners. Developmental studies programs are more often a series of disconnected courses and not a "program" that connects learning across reading, writing, and mathematics. All higher education institutions offering developmental studies programs must identify the components of a program which include all services required of developmental studies students that remove barriers to persistence and academic success. Consequently, the following recommendations are suggested:

- Formative studies that include the demographics of gender, race, age, and socioeconomic status may prove valuable in developing more effective developmental studies programs.

- Additional formative data, representative of all community and technical colleges across the state, may be useful in determining the extent to which developmental studies programs reach their intended objectives.

- Data indicating reasons why developmental studies students fail to persist and achieve academic success at rates comparable to the control group would be useful in designing more effective developmental studies programs.

- Additional studies addressing limitations placed on developmental studies students including access to child care, transportation, peer support, family support, and college support services would be useful in developing more effective programs of study to meet the needs of these learners.

Universities, senior colleges, and community colleges must begin to assess the effectiveness of their developmental studies programs and conduct formative assessments

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in order to measure program improvement. Educators cannot know how well they are accomplishing the objectives of these programs without a report card. Further, without a comprehensive formative measure of the success of developmental studies programs, colleges cannot hope to design more effective practices to meet the needs of this ever-growing population of students who require access to higher education through effective developmental studies programs.

APPENDICES

APPENDIX A

Developmental Studies and Academic Course Descriptions

APPENDIX A

Developmental Studies and Academic Course Descriptions

ENGL	0304	Developmental Reading I	Credit Hours	3
Prerequisite:		Placement by testing		3/2/80

A basic reading course designed to improve reading efficiency through word analysis skills, vocabulary, comprehension, and rate. Sentence/paragraph writing is required to complement extensive and varied reading activities. This course carries institutional credit but will not transfer and will not be used to meet degree requirements. (3201085235)

ENGL	0305	Developmental Reading II	Credit Hours	3
Prerequisite		Placement by testing		3/2/80

A developmental reading course continuing the instruction and reinforcement of those skills taught in ENGL 0304. Emphasis is on learning higher level reading skills required for college reading assignments. Short paragraph writing is required to complement reading activities. This course carries institutional credit but will not transfer and will not be used to meet degree requirements. (3201085235)

ENGL	0306	Developmental Writing I	Credit Hours	3
Prerequisite		Placement by testing		3/2/80

The first of two developmental writing courses designed to improve the student's basic writing skills. Class activities and lab assignments will be used to produce clarity and precision in sentence and paragraph structure. Specific course topics include an introduction to the writing process and a review of grammar, usage, and mechanics. This course carries institutional credit but will not transfer and will not be used to meet degree requirements. (3201085335)

ENGL	0307	Developmental Writing II	Credit Hours	3
Prerequisite		Placement by testing		3/2/80

The second course in the developmental writing sequence designed for those students with a stronger background in grammar skills who need further help developing paragraphs and short themes. Lab work will be assigned to reinforce calls activities. This course carries institutional credit but will not transfer and will not be used to meet degree requirements. (3201085235)

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ENGL	1301	Composition and Rhetoric I	Credit Hours	3
Prerequisite		Placement by testing		3:0:48

Composition, oral and written; readings in modern prose. Emphasis on language study and the mechanics of writing. Emphasis on short composition. All students are required to achieve a departmentally approved score on a proficiency test before credit for the course may be awarded. (2304015135)

MATH	0306	Pre-Algebra Mathematics	Credit Hours	3
Prerequisite		Placement by testing		3:0:48

Topics for all formats include basic arithmetical operations on integers and rational numbers, order of operations, introduction to basic geometric concepts, simplification of algebraic expressions and techniques of solving simple linear equations. This course carries institutional credit but will not transfer and will not be used to meet degree requirements. (3201045137)

MATH	0310	Intermediate Algebra	Credit Hours	3
Prerequisite		Placement by testing		3:0:48

Topics for all formats include special products and factoring, rational expressions and equations, rational exponents, radicals, radical equations, quadratic equations and complex numbers; an introduction to the function concept and graphing; equations of lines and linear systems. This course carries institutional credit but will not transfer and will not be used to meet degree requirements. (3201045237)

MATH	1314	College Algebra	Credit Hours	3
Co-requisite		MATH 0310 or placement by testing		3:0:48

Topics include absolute value equations and inequalities, graphing skills, inverse functions, logarithmic and exponential functions, polynomial and rational fractions, piecewise-defined functions, theory of equations and matrices. (2701015437)

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APPENDIX B

Letter of support from the Texas Higher Education Coordinating Board, Division of Community and Technical Colleges

Texas Higher Education
COORDINATING BOARD

P. O. Box 12788, Austin, TX 78711 • 7745 Chevy Chase Drive, Austin, TX 78752
TEL 512-483-6250 • FAX 512-483-6444

COMMUNITY AND TECHNICAL COLLEGES DIVISION

GLENDA O. BARRON
Assistant Commissioner

MOLLY H. BOYD
Director of State and Federal Initiatives

CHARLES M. COOK
Director of Instructional Programs

June 24, 1998

Dr. Robert C. Cloud
Professor of Educational Administration
Department of Educational Administration
Baylor University
P.O. Box 97313
Waco, TX 76798-7313

Dear Dr. Cloud:

I am pleased to write this letter in support of Mr. Terry Sawma, who is pursuing his doctorate of education at Baylor University in the Collegiate Scholars of Practice program. As Director of Instructional Programs for the Community and Technical Colleges Division, I am supportive of and interested in the results of Mr. Sawma's multi-year longitudinal study of developmental studies education at North Harris Montgomery Community College District.

As you are aware, the state of Texas spends millions of dollars each year funding instruction for individuals to prepare themselves for enrollment in college-level courses. Studies that shed light on efficient and effective ways of determining the quality and delivery of such programs are of interest to the Coordinating Board staff and to the state's citizens who help fund the programs.

I look forward to receiving the results of Mr. Sawma's study and would be available for consultation, should the need arise. Please feel free to contact me at cookcs@thecb.state.tx.us or at (512) 483-6250

Sincerely,

Charles M. Cook

Charles M. Cook, Ed.D.

CMC/ca

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AN EQUAL OPPORTUNITY EMPLOYER

APPENDIX C

Letter of support from Dr. John Pickelman, Chancellor,
North Harris Montgomery Community College District

NORTH HARRIS MONTGOMERY
COMMUNITY COLLEGE DISTRICT

250 N. Sam Houston Parkway East
Houston, Texas 77060-2000
(281) 260-3500
FAX (281) 260-3513

North Harris College
2700 W.W. Thorne Drive
Houston, Texas 77073-3499
(281) 618-5400

Kingwood College
20000 Kingwood Drive
Kingwood, Texas 77339-3801
(281) 312-1600

Tomball College
30555 Tomball Parkway
Tomball, Texas 77375-4036
(281) 351-3300

Montgomery College
3200 Highway 242 West/
College Park Drive
Conroe, Texas 77384
(409) 273-7000

Board of Trustees

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Mary Matteson
Vice-Chair

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Secretary

Priscilla Kelly
Assistant Secretary

Elmer Beckendorf
Gene Caldcleugh, Ed.D.
David Robinson
Larry Shryock
David Vogt

Chancellor

John Pickelman, Ph.D.

July 28, 1998

Dr. Robert C. Cloud
Professor of Educational Administration
Department of Educational Administration
Baylor University
P.O. Box 97313
Waco, Texas 76798-7313

Dear Dr. Cloud:

I am pleased to write this letter in support of Mr. Terry Sawma, who is pursuing his doctorate of education in the Collegiate Scholars of Practice program at Baylor University. As Chancellor of the North Harris Montgomery Community College District, I am supportive of, and interested in, the results of Mr. Sawma's multi-year longitudinal dissertation proposal. His study is a systematic analysis of the success of the developmental studies programs at North Harris Montgomery Community College District.

As you are aware, the state of Texas invests millions of dollars each year to fund developmental instruction for individuals preparing themselves for enrollment in college level courses. Institutional research that evaluates the effectiveness of developmental studies programs provides opportunities for program improvement and for determining more effective delivery mechanisms. I look forward to receiving the results of Mr. Sawma's study.

Sincerely,

John E. Pickelman, Ph.D.
Chancellor

xc: Terry Sawma

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APPENDIX D

Letter of support From Dr. Linda Stegall, Kingwood College President and former Vice Chancellor of Education and Student Development, North Harris Montgomery Community College District

NORTH HARRIS MONTGOMERY
COMMUNITY COLLEGE DISTRICT

250 N. Sam Houston Parkway East
Houston, Texas 77060-2000
(281) 260-3500
FAX (281) 260-3513

North Harris College
2700 W.W. Thorne Drive
Houston, Texas 77073-3499
(281) 618-5400

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20000 Kingwood Drive
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(281) 351-3300

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3200 Highway 242 West/
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Assistant Secretary

Elmer Beckendorf
Gene Caldcleugh, Ed.D.
David Robinson
Larry Shryock
David Vogt

Chancellor

John Pickelman, Ph.D.

July 29, 1998

Dr. Robert C. Cloud
Professor of Educational Administration
Department of Educational Administration
Baylor University
P.O. Box 97313
Waco, Texas 76798-7313

Dear Dr. Cloud:

I am pleased to write this letter in support of Mr. Terry Sawma, who is pursuing his doctorate of education in the Collegiate Scholars of Practice program at Baylor University. As Vice Chancellor for Education and Student Development, I am supportive of, and interested in, the results of Mr. Sawma's multi-year longitudinal dissertation proposal. His study is a systematic analysis of the success of the developmental studies programs at North Harris Montgomery Community College District.

As you are aware, the State of Texas invests millions of dollars each year to fund developmental instruction for individuals preparing themselves for enrollment in college level courses. Institutional research that evaluates the effectiveness of developmental studies programs provides opportunities for program improvement and for determining more effective delivery mechanisms.

I look forward to receiving the results of Mr. Sawma' study and am available for consultation, should the need arise. Please feel free to contact me at lindas@nhmccd.edu or at 281-260-3522.

Sincerely,

Linda Stegall

Linda M. Stegall, Ed.D.
Vice Chancellor for Education and Student Development

Copy to:
Terry Sawma

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APPENDIX E

The original data, in a visual fox pro format, was reformatted in rich text format (rtf) and pressed onto the enclosed compact disc located in the back pocket of this document.

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